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THE
EDINBURGH MEDICAL JOURNAL

NUNQUAM ALIUD NATURA, ALIUD SAPIENTIA DICIT.

THE EDINBURGH MEDICAL JOURNAL

EDITED BY

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EDITORIAL.

The Centenary of the Journal.

It is a matter of universal recognition that epochs of national struggle are likewise periods of intellectual development. The era of Marathon and Salamis was also the age of Pindar and Aeschylus. This is assuredly no exceptional illustration. It is one that has its parallel in many a page of ancient history. In our own Western annals similar coincidences are to be seen. The glorious triumphs of Howard and Drake upon the seas were rivalled by the splendid achievements of Spenser and Shakespeare in the walks of literature.

The close of the eighteenth and the beginning of the nineteenth century furnished another example of the same truth. When the United Kingdom was engaged in its Titanic struggle with the mighty Dictator of the Continent, a new impetus was given to literature and science. Amongst the memorable results of this new stimulus must be ranked the origin of modern literary and scientific periodicals. It is worthy of note that, in both departments of knowledge, the earliest steps were taken in the Scottish metropolis. A brilliant galaxy of gifted men inaugurated the new departure by founding *The Edinburgh Review* in the second year of the nineteenth century. The story of their enterprise was recently told in the Centenary Number of that magazine.[1]

Edinburgh at the same time was remarkable for the number of distinguished men then adding renown to the city by the lustre of their achievements in science and medicine. Ferguson, Playfair, Jamieson, Rutherford, the Homes, Gregory, Hope, the elder Duncan, and Monro Secundus then adorned the University; while outside of its ranks, Charles, George, and Benjamin Bell, William Newbigging, John Thomson, John Cheyne, Alexander Morison, James Hamilton, John Abercromby, the younger Andrew Duncan, Alexander and Andrew Wood, and many others were prominent in the world of medicine. At the particular time about to be dealt with, Principal Baird controlled the destinies of the University, while Thomas Spens and John Rae presided over the two Royal Colleges.

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[1] *The Edinburgh Review*, London, 1902, vol. cxcvi. p. 275.

On New Year's Day in 1805, ten months before the glorious victory of Trafalgar, and ten years before the conclusive triumph of Waterloo, a development, in some respects resembling the foundation of *The Edinburgh Review*, occurred in the ranks of medicine. Although different medical periodicals had appeared from time to time, both in London and in Edinburgh, there was in the early days of last century no recognised medium of medical information. As we learn from the "Memorial of Archibald Constable,"[1] preparations had been made during the year 1804, for the publication in Edinburgh of a medical journal. It is clear that the initiative was taken by the younger Andrew Duncan, and certainly the chief burden of the enterprise was borne by him. Under his editorship the first number of *The Edinburgh Medical and Surgical Journal* appeared as a quarterly magazine in January 1805. The advertisement sets forth the intention of the founders, and is characterised by tolerant views and catholic aims. To these the Journal remained faithful during the half century of its independent existence, and it contained contributions by celebrated men from every civilised country. Duncan was succeeded in the editorial chair by Robert Christison, in association with David Craigie, as is shown in the life of Sir Robert by his sons.[2] It was in 1827 that this change of editors took place, and for some years thereafter Christison remained in association with Craigie. After his resignation the latter remained sole editor until 1855.

Towards the end of the year 1840 a powerful committee announced the intention to publish a monthly journal, and in January 1841 the first number of *The Edinburgh Monthly Journal of Medical Science* was published, John Rose Cormack being the editor. Under the "Medical News" there is set forth a brief explanation of the appearance of the Journal, which, in respect of there being then no monthly medical journal in existence in the British Isles, was intended to supply a want. The number for September 1841 bore a change in the title, which was altered to *The London and Edinburgh Monthly Journal of Medical Sciences*, and this continued to be the style of the Journal until January 1846, when it became simply, *The Monthly Journal of Medical Science*. Two years and a half later, Cormack, who had been aided by John Hughes Bennett, demitted the office of editor, and the volume beginning with July 1848 bore the names, as joint-editors, of George Edward Day, Alexander Fleming, and William Tennant Gairdner. From this time onwards the Journal was anonymous, but, as Sir William Gairdner (who is still fortunately with us to aid us by his wise counsel) has informed the writer, in the early fifties Bennett once more assumed the editorial chair, and was aided in his duties by William Robertson. As is generally understood, William Sellar and John Brown assisted in the ordinary editorial work of the Journal, while the amusing and interesting Colloquia came chiefly from the pen of Andrew Douglas Maclagan.

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[1] "Archibald Constable and his Literary Correspondence: a Memorial by his Son, Thomas Constable." Edinburgh, 1873, vol. i. p. 49 and p. 60.

[2] "The Life of Sir Robert Christison, Bart.," edited by his Sons. Edinburgh and London, 1885, vol. i. p. 370, and vol. ii. p. 3.

In the April number of 1855 an announcement was made by the Editor, that *The Edinburgh Medical and Surgical Journal* would for the future be amalgamated with its younger monthly rival, and the same number contained an advertisement by Messrs. Sutherland & Knox to a similar effect. On the 1st July of that year, accordingly, *The Edinburgh Medical Journal* made its first appearance, the editor being Henry Duncan Littlejohn, who, as the veteran Professor of Medical Jurisprudence in the University, is happily still with us in perennial youth. After some years Littlejohn resigned the conduct of the Journal into the hands of Daniel Rutherford Haldane, who was greatly assisted in carrying on his work by his friend William Rutherford Sanders. Haldane, in turn, was followed by George William Balfour, who conducted the Journal for several years. The editorial chair was then filled by Joseph Bell, who presided over the Journal until the end of 1896. Since January 1897 it has been under its present editorial management.

This is not the place to pass in review the valuable contributions which have been made towards the advance of the medical sciences through the medium of the Journal. In the announcement, made on 1st April 1855, of the approaching amalgamation of the two rival journals, the editor, speaking of *The Edinburgh Medical and Surgical Journal*, says: "Of how many theories has it witnessed the rise and the decline!" Looking back over the vista of a hundred years, the same train of thought must be even more urgent, and another opportunity will be taken for the purpose of giving a retrospect of the past. What changes the Journal has witnessed and aided in the growth of knowledge and in the paths of discovery, it will be the purpose of a Special Number to chronicle.

The Late M. Marey.

THE world of medicine mourns the death of the illustrious Marey. One of the enthusiastic band of scientific pioneers—Hales, Poisseuille, King, Ludwig, Fick, Vierordt, Marey and Chauveau—who inaugurated the modern investigation of circulatory phenomena, he has left an imperishable name. A native of that portion of Burgundy which lies between the Vosges and the Cevennes, Marey was gifted with the imagination which might be expected from one born on the "golden slope." Educated amongst the brilliant group of men who adorned the French capital in the middle of last century, he very early distinguished himself by his originality, and from 1860, when he gave to the world his sphygmograph, to 1881, when his classical work, "La circulation du sang," made its appearance, he enriched physiology and pathology by the publication of numerous valuable researches. As one of the earliest to apply the graphic method of Young to the movements of living beings, Marey conferred inestimable benefits upon the practical physiologist, and, as several of his instruments were eminently simple in design and easy to employ, clinical medicine was no less his debtor. In private life Marey was amongst his contemporaries a delightful companion and steadfast friend, while to younger men he was unfailing in suggestion and untiring in encouragememt. Little wonder that his loss is deeply lamented.

Eye-Strain.

To a thoughtful mind a curious feature of medicine, and doubtless of other sciences also, is the effect of fashion and habit in reference to methods of treatment, to theories of disease, and what not. Some one discovers a principle which may prove, on investigation, to be of far wider application than at first was dreamed of, or suggests a method of treatment for some malady, possibly arrived at empirically or even accidentally; its use is extended to other diseases, in a blundering fashion sometimes, after careful reasoning at others; and it is found by its means that two diseases, not hitherto supposed to be distinct, are in reality quite separate entities, reacting in diverse manners to the new method; or again two separate and dissimilar diseases are found, by their analogous reaction, to have really one common basis. That which was simple becomes complex; that which was complex becomes simple.

At a later stage, the theory or the drug, having been tested for all forms of evil, having been "boomed," as the phrase is, in season and out of season, having been applied here, there, and everywhere, is found to have an area of suitable application quite other than the Promised Land of the visionary's speculation visible from the Pisgah of inexperience. Then, to change the metaphor, the reaction comes, and the theory or agent is discredited and looked upon more and more coldly; and a theory of ailment, or a means of cure, which, within proper limits, is of real value, is totally relegated to limbo and black night, because it has failed to fulfil the extravagant and unreasonable hopes which were at first embraced regarding it.

These thoughts were suggested to the writer by noticing what is now being said in certain quarters regarding eye-strain. Eye-strain and its results, or the existence of an error in the refraction or position of the eye, and the reaction in the system consequent upon the efforts made to correct it, has had an interesting career.

Who first discovered its malignant powers does not greatly matter —there it is. Neglected for a time, it after a while "caught on," and then in certain quarters and by certain physicians it was made the scapegoat for everything and anything. The theory was (or is) that by reason of the constant efforts to correct some optical error, so much waste of nerve force was incurred that many morbid reflexes were set up. If the exponents had been content to be moderate, and to attribute to eye-strain headache and similar symptoms, they would have carried with them the good opinion of all sound practitioners, but the list of "convictions" recorded against the prisoner has been swelled to an appalling bulk. We are told, for example, in a book by Ranney (New York), one of the most zealous of the zealous, that diabetes is at times due to eye-strain. Gould (Philadelphia), another John Baptist of eye-strain, considers that it may be to the wear and tear produced by eye-strain that the tubercle bacillus owes its chief chance of success in attack. Another writer attributes moral delinquencies to astigmatism.

A very interesting discussion, to judge from the published reports, took place recently in the New York Academy of Medicine, the subject of which was, "The Eye in its Relation to Functional Nervous Disease." The first paper was by Dana, who divides eye-strain into two varieties—(1) An effort to overcome errors of refraction or of muscle balance, and (2) an effort to supplement cortically the imperfection of the images received by a defective eye. This latter kind of eye-strain, which is really a brain-strain, was in his view the only kind of strain which could do any harm. We do not say we altogether agree with this statement, but with the following sentence we are certainly in accord: "Glassing was enormously overdone as well as underdone, and had become in a way a real psychosis." In several of the other papers, too, there was made a strong plea for more common sense in the view taken in regard to eye-strain than prevailed in some quarters. In dealing with chorea, Dr. Sachs was very trenchant: from his personal experience he did not know, he said, of a single case in which the epileptic seizures had been altogether inhibited or even diminished in number by the wearing of glasses, by the cutting of muscles, or by any other ocular measures which had been adopted.

From the frank expression of these views, contrasting so strongly with those mentioned previously, it appears, then, as though the palmy days of eye-strain were beginning to decline. It is very necessary that this should be so, for the claims made by faddists on its behalf have been absurdly extravagant. It was in America almost entirely that these faddists and their pretensions have flourished, and now in America even the axe is being laid to the root of the tree. What we would urge is, that we have in eye-strain, if that be a suitable expression, a source of reflex irritation and loss of nerve force capable of doing much functional injury to an unstable organism; we ought to recognise this perhaps more frequently than we do. But on the one hand we ought not to be led astray into thinking that it is the root of all evil, while on the other we must not abandon the recognition of its existence as a very serious and somewhat frequent evil, because its enthusiastic friends had "puffed" its merits unwisely in the past. The frog is still a good frog, although it has failed to make itself look like a bull.

Post-Graduate Education.

IT is a matter for regret that Edinburgh, with its wealth of teaching and clinical material, and its world-wide clientele, does so little for post-graduate education. In this respect there can be no doubt that Edinburgh is behind the times. Some years ago an attempt was made to remedy this defect, but with only partial success. The reasons why complete success did not attend this praiseworthy attempt were probably, first, that the time was hardly ripe; second, that an insufficient number of teachers were incorporated in the movement; and, third, that the organisation was defective. In endeavouring to find the causes for the merely partial success of that movement, it must be remembered that we are only venturing an opinion, and that we do not for a moment wish to dogmatise on the subject, but, so far as can be ascertained, it does not seem improbable that some such reasons as those given were primarily responsible for the want of complete success which attended the first venture in the important subject under consideration.

In suggesting the re-institution of post-graduate courses in Edinburgh, it should be remembered that the conditions which now govern the granting of the M.D. degree are considerably changed. It results from these changes that a larger number of graduates take the more advanced degree than formerly, and that these graduates return to Edinburgh in the summer session for clinical and scientific work. There is, therefore, a larger number of graduates to draw upon for such a course.

Another difficulty to be faced in the proposal is, that teachers are disinclined to undertake post-graduate education in the summer vacation year after year. We are, however, of opinion that this difficulty could be successfully overcome. We have already pointed out that graduates now return to Edinburgh for the M.D. at a much earlier period than under the old conditions. It should, therefore, be quite possible to institute six-weeks' courses, commencing in the middle of June and terminating at the end of July, just prior to the graduation ceremonial, whilst the teaching difficulty could be overcome by having a staff large enough to take duty once in every three years. We are further of opinion that the courses should be given by a combination of both university and extra-mural teachers. This proposal would tend to consolidate the teaching school as a whole, and would overcome the difficulty under consideration. As an example, let us take that important post-graduate subject—" bacteriology,"—between the university and the extra-mural school an exceedingly able staff could be secured for this subject, one of whom could take duty each year, and in this way the burden of teaching would fall but lightly on the individual teacher. One year, for example, it might be given by a university assistant, and in the next, or alternate years, by one of the extra-mural staff. If this proposal were carried out, it would result in the formation of, say, three complete staffs undertaking duty once every three years, whilst there would at no time be any vacation work. Each staff would be composed of a judicious admixture of intra- and extra-mural elements, greatly, we believe, to the advantage of the school in general, and the courses in particular.

As regards subjects, no difficulties need be anticipated. We have already pointed out that Edinburgh's teaching wealth is so great, that such courses as surface anatomy, histological technique, bacteriology, clinical pathology, nervous diseases, diseases of the blood, ophthalmology, diseases of the skin, diseases of the ear, nose, and throat, abdominal surgery, operative surgery, and many other subjects, could be commenced under the conditions suggested almost at once.

If the permission of the University Court could be obtained, in order to enlist the University Assistants in the movement, a committee of management, and an organising secretary might be appointed, and all arrangements made to institute such a course of post-graduate education for, say, the summer of 1905.

We believe that post-graduate education, run on some such lines as those suggested, would prove a success, and that it would tend to the advancement of the University and of medical education; and if given at the times suggested, the courses would tend to secure not only the attendance of prospective M.D. graduands, but also of those fortunate gentlemen who, at the period named, would have just passed the final examination for the degree of M.B., Ch.B.

Sherlock Holmes and Conan Doyle.

THERE is a rather clever skit upon Sir Arthur Conan Doyle's series of articles, recounting the adventures of a certain acute-minded gentleman of the name of Sherlock Holmes, in *The Boston Medical and Surgical Journal* for the last week of May. It has always been our impression that the author of these tales has made the mouthpiece of them—that is to say, Dr. Watson—a most simple-minded ass. This very amusing article reverses matters, and makes out that Conan Doyle's doctor could teach Sherlock Holmes one or two things. We might quote a portion:

"The patient enters, and sat before Watson's table.

"'Musician, did you say?' asked Holmes apathetically.

"'Yes, musician; and I should add, a player on a wind instrument.'

"Holmes examined the man's buccinators in their normal condition, and then got him to puff out his cheeks. He appeared satisfied with his examination, and when Watson asked him if he had made up his mind as to how he, Watson, had arrived at his conclusion as to the man's occupation, he answered, in a tired way, 'Why, certainly, you have only to look at the muscles of his lips and cheeks; they tell the story.'

"'Wrong,' said Watson; 'it's much simpler than that. Just observe the little goatee he wears. I venture to say he believes the loss of that would prevent his playing for a week. Am I right?' he asked, turning to the man.

"'Oh yes, sir. I wouldn't cut that off for the world; it's strengthening to the lip, and I shouldn't be able to play till it grew again.'"

Watson soon got at the facts of the case, examined and disposed of it. During this time Holmes looked absently out of the window. Watson in this case had Holmes on the hip. And if one thinks of the series of stories about Sherlock Holmes, one is amazed, as has been said before, how a medical man could draw the portrait of another member of the profession in such an inglorious light as Conan Doyle had of the simple-minded London specialist, Dr. Watson. So that is the end of this story.

ORIGINAL COMMUNICATIONS.

SOME CLINICAL NOTES ON TUBERCULOUS ARTHRITIS IN THE YOUNG.[1]

By ROBERT JONES, F.R.C.S., *Liverpool.*

MR. PRESIDENT AND GENTLEMEN,—I have chosen the subject of tuberculous joints, because from my earliest days I was associated with the late Hugh Owen Thomas in his strenuous advocacy of conservatism in their treatment, and because there may be many differences between my own practice and that of the eminent surgeons in your own city. In an address of this kind, necessarily disjointed and scrappy, I do not intend to present elaborate statistics, nor indeed to do more than touch, and that lightly, upon certain features in the diagnosis and treatment of tuberculous arthritis in the young. I emphasize the *young*, because tubercle in the *adult* is infinitely more serious, runs a much more malignant course, and often requires more heroic methods.

Mr. Thomas's treatment was based on a theory of mechanical and physiological rest. Mechanical rest he attained by carefully attaching the joint to a rigid iron frame; physiological rest by allowing free circulation through the joint, hampered as little as possible by circular compression. He argued that rest of the joint was hindered by extension, and that, where traction appeared to benefit, it was in virtue of the fact that traction must needs be accompanied by a certain degree of fixation. Friction, as represented in his time by passive movements, he thought a much more dangerous proceeding than mere pressure of one joint surface upon another. In fifteen years, to my own knowledge, he never performed an excision of a joint, although very many hundreds of cases passed through his hands, and his percentage of abscess formation was unusually low. In those early days I had exceptional opportunities of watching the progress of his cases, and I am very sure when I say that neither before, nor by any methods since, have I seen anything approaching the consistently good results which he obtained. I became a very early convert to his teachings, and since he died, fourteen years ago, I have found no need to modify essentially the doctrines which he taught.

Without going into details as to diagnosis, I desire to draw attention to two symptoms which, if properly interpreted, are of considerable value. I allude to rigidity and deformity. One of the first and more reliable accompaniments of arthritis is rigidity. It generally precedes pain, and is earlier ascertained than muscular shrinkage. There are certain points in relation to this rigidity which either give to it, or deny to it, clinical value in relation to the diagnosis of arthritis. In arthritis, no matter what the joint, the rigidity affects it in all directions—flexion, extension, abduction, adduction and rotation. In a suspected joint, if there be no limitation of movement, there is no arthritis. The exceptions to this rule are so rare that I have come to treat it as an axiom. In early cases the rigidity must be examined, for without an anæsthetic, as it is primarily due to muscular action, later contractures or muscle shortening will follow as secondary effects, but by then a diagnosis will be obvious. As an illustration we may take the case of the spine and the knee. A girl complains of pain in her back in the dorso-lumbar region. The surgeon asks her to flex, extend, and laterally move her spine, which she does freely. In such a case one can safely exclude a spondylitis. Another girl may be very tender over the spine, have great difficulty in flexing her column, but she can hyper-extend it with ease, and here again we may place to one side our suspicion of tubercle. In a third case, the spine is rigid in ALL directions, and this symptom is quite in accord with an inflammatory vertebral lesion. Rigidity is more reliable than any other single symptom or any single group of symptoms. Pain, as evidenced by pressure on the vertebral spines, is hopelessly unreliable, and if present is an argument against rather than in favour of a Potts lesion. In early spondylitis, where the disease is confined to the front of the vertebral bodies, it is unreasonable to expect pain from pressure upon the spines.

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[1] Read by invitation of the Edinburgh Medico-Chirurgical Society.

Let us again take the knee, by way of illustrating the symptom of rigidity. A youth complains of tenderness and swelling of a joint which he is able fully to *extend* but cannot fully *flex*. We may be sure he is not the victim of tuberculous arthritis. If, however, both as to flexion and extension, the knee has a diminished range of movement, powerful confirmation of organic lesion is vouchsafed. A joint requiring forcible manipulation is very often a tender joint, sometimes swollen, with certain limitations in movement. It is tender and swollen because of the constant irritation produced by adhesions being partially stretched. Such cases are the bone-setter's harvest, and occur not infrequently in the young. In cases of prolonged synovial effusion in joints, where tuberculous infection has occurred, the absence of rigidity may deceive, but such effusions are rare in children. I would desire to impress upon you, gentlemen, that in arthritis the movements of a joint are limited not in one, or some, but in all directions. Upon the full appreciation of this fact, much may depend.

In the very early stages of hip disease, lack of normal extension and rotation are more noticeable than are restrictions to flexion and the lateral movements; but a careful comparison between the movements possible at the two hip-joints will render the defect apparent to one who has become at all familiar with this peculiar symptom. To describe the sensation is difficult;

it is better learned from the patient than from a surgeon. The restriction which involuntary muscular spasm gives to attempted passive motion is not the slowly elastic yielding of voluntary muscular opposition, nor the sudden dead stop of ligamentous or fibrous adhesions; nevertheless it is a sudden and positive stop, which, once felt, will always be recognised.

For simplicity of examination, we are accustomed to test for flexion both in hip and knee, as this restriction is more obvious than any other, and is the most directly disabling. To detect flexion in the hip considerable care is needed, more especially in early cases and in the very young. The Thomas flexion test is founded upon our inability to extend an inflamed hip without producing lordosis (Fig. 4). By lifting the knee of the sound limb until it touches the chest, the pelvis is fixed and the spine is straightened (Figs. 1 and 1A). If there be flexion deformity, the patient is unable to extend the thigh on the diseased side, and it remains at an angle (Fig. 2). If disease be absent, the patient can voluntarily extend his limb. Some of us have not observed that if we take any healthy subject, and lay him flat upon a table, we can easily pass our hand under the lumbar vertebræ; but if we

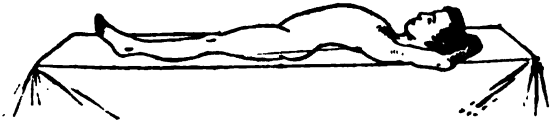

FIG. 4.—Shows lordosis present in hip disease.

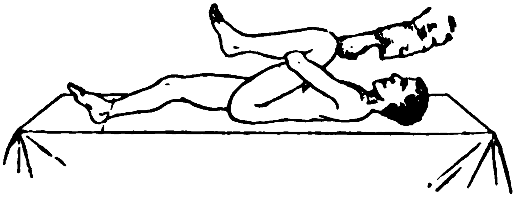

FIG. 1.—Method of flexing normal thigh on pelvis.

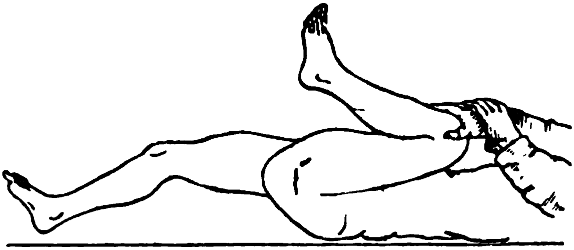

FIG. 1A.—Faulty method of examining by lifting pelvis upon spine.

ask the subject to touch the table with his back, he is able to obliterate the hollow without lifting his limb. This is a ready guide for the detection of deformity. In no case of hip disease is the patient able to straighten his spine, until art has stepped in and corrected the flexion deformity (Fig. 2).

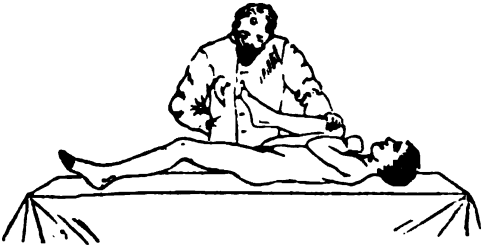

FIG. 2.—Inability to straighten diseased limb whilst normal hip is flexed.

The application of the flexion test in the case of an infant requires considerable delicacy. A child 2 or 3 years old is brought for examination. A vague history of irritability may be alone complained of, or pain may be occasioned when the child is washed. The surgeon is to find out, in the first place, whether there is an inflamed joint, and, if so, on which side. The child is gently put upon the table, while the surgeon, without exciting alarm, holds a knee in either hand. The thighs are slowly flexed towards the chest, when it is observed that one easily yields to full flexion, while the other becomes a little rigid. The stiff hip is then gently allowed to fall, while the sound one is fully flexed (Fig. 3). It will then be perceived that the diseased limb remains at an angle and cannot voluntarily be fully extended. Stress must be laid upon the necessity of not startling the child, and of not using the slightest force; while care must be taken, first, not to flex the pelvis upon the spine, and, secondly, to conduct the examination upon an even, flat surface. Although this test is not

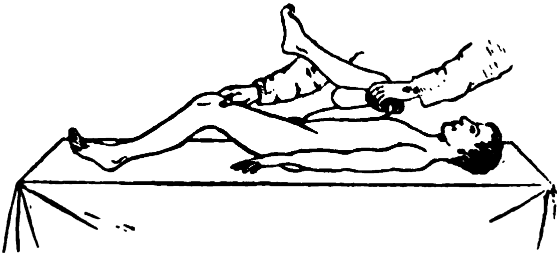

FIG. 3.—Surgeon gently flexes both limbs, and finding the left more rigid, continues only to flex the right, while he allows the left to fall. Useful in the case of small children who cannot say on which side the disease is.

absolutely diagnostic, still, if the hip be complained of, and pelvic, vertebral, or sacro-iliac disease be negatived, one can fairly infer the presence of arthritis.

The arthritis deformities are almost constant in character, and are practically all avoidable. In late hip they consist of flexion, internal rotation, shortening, and abduction; in the knee, flexion, subluxation, and external rotation of tibia; in the back, a kyphos sometimes preceded by a lateral deviation; in the shoulder, elevation of girdle, adduction; and, in the later stages, what I have described as a pathological subcoracoid displacement of the humerus. The spinal lateral deviation is very important clinically, and I have seen serious mistakes made by excellent surgeons who have mistaken this lateral deviation accompanying Potts for a symptom of scoliosis. In early Potts, rigidity would be present; in lateral curvature, rigidity is only present in the later stages where rotatory changes have occurred. To illustrate the value of the early recognition of deformities of the shoulder, to which but scant reference is made in our text-books, I submit to you this incident.

A man from a northern country town brought his son, a youth of 19, to consult me about his shoulder, which it was said had been dislocated for over two years. The boy fell from the box of a brougham upon his shoulder. It was painful and swollen. The family doctor prescribed rest and lotions, and, after a few weeks' attendance, left his patient with a few general instructions. Time passed, the joint was painful, and in due course he was taken to the Metropolis, where dislocation was diagnosed, to the discredit and humiliation of the local practitioner, who fully believed he had made a grave initial error. I was soon able, however, to convince the father that the case was one of pathological displacement, that the local practitioner against whom he raved was guiltless, and that attempts at reduction would be of no avail. How important, therefore, both for the sake of the patient and the previous attendant, that the differences and the similarities between the two conditions should be noted. The muscular shrinkage was more marked, the head of the bone less displaced, and the coracoid more prominent in the pathological shoulder than would have been the case in an old injury. In a dislocated shoulder the disability is greatest in the beginning, and as weeks pass by an excellent range of movement results. In the pathological variety the precise converse obtains, and an ankylosed shoulder generally results.

If we trace a neglected case of coxitis from health to disease, and back again, we find that involuntary spasm of the flexors of the thigh becomes more and more pronounced, until at length the joint mobility has gone. The typical deformities appear, and the position of the limb is such that, when the patient attempts to walk, the body-weight is on the diseased side for comparatively only a brief period at each step, and anything like prolonged weight-bearing while standing at rest is impossible. Later, the joint may become so painful that weight-bearing and even vibration are not tolerated, and the patient takes to bed. The leg assumes the position of greatest comfort, and muscular spasm protects and locks the joint. As the patient falls asleep the muscular spasm relaxes, motion takes place, injury is inflicted, the child screams, and the muscles are again on guard. Long continued malposition results in structural shortening of the tissues of the flexure side, and immobilisation is maintained with but little muscular effort. When the joint has been free from motion and weight-bearing for a time, the tenderness passes off, the patient is ultimately enabled to place full weight upon the affected side; nevertheless spasm and rigidity are maintained for a long time. When the disease has terminated, the spasm disappears, but the structural shortening of the soft part remains and yields gradually to use during the subsequent months and years. The result of this cure by the natural process is an extremely deformed limb, with impaired movements. The defects appear to be due to the prolonged course of the disease, which hinders the growth of the limb, and renders more rigid the shortened muscles, and to the position of deformity in which the leg rests while structural shortening takes place.

The means which art adopts, therefore, are to protect from deformity, or, if deformity has appeared, to correct it, and thus to rob the muscular contraction of its power for evil; to immobilise the joint, and thus relieve the muscles from spasm and then from contracture; to relieve pain and prevent the bone destruction due to both attrition and pressure, and to relieve the joint from weight-bearing. The all-essential treatment therefore is rest.

For coxitis in very young children I do not use a single but a double splint. It immobilises better, it is easier to apply, easier maintained in position, and simplifies nursing. In this frame the child is kept until all signs of disease are gone, as evidenced by tests to which I will refer. Sunlight and fresh air are desiderata of incalculable value, and the child lives in the open air. Such cases seen early go on generally without complication, many recovering with movable joints, remaining in splints often for two years, and rarely exhibit a flexion deformity of more than 10°. The circulation through the hip must in no way be hampered by the appliance. Leverage pressure is obtained above, by the body wings of the splint. In early cases I never employ extension, and if immobility be well secured, the so-called night-jerks will hardly ever trouble. Pain will be felt at first, but it lasts only during the correction of the flexion, which in an early case occurs almost at once.

A more difficult class to treat is the child whose disease is more advanced, and whose deformity is considerable. This is a common variety seen at my clinic or my rooms. The femoral head is displaced upwards, adduction is present, with a shortening of from 1 to 4 in. If the general condition of the child be satisfactory, I have an anæsthetic administered, and set myself to correct the deformity. This may require some force, steadily not jerkily applied, and in children never requires the aid of special machinery. A direct pull by means of a thick skein of wool, and counter-extension by a sheet between the limbs on the sound side, division of the adductors if they are tense, will generally equalise so-called practical or apparent length of limb. I prefer to correct the deformity at one sitting, rather than irritate the joint on many occasions by lesser pulls. The correction consists in overcoming flexion and adduction and lowering the pelvis on the diseased side. Once in the abduction frame (Fig. 5) the limb is kept at absolute rest, and the constant muscular pull upon the femoral head, as evidenced by ever-increasing deformity, is overcome. I know that to many surgeons this teaching will appear heretical, but I can truly say, speaking from an experience of many hundreds of such cases, that dissemination of tubercle does not track such cases any more often than it does those left alone.

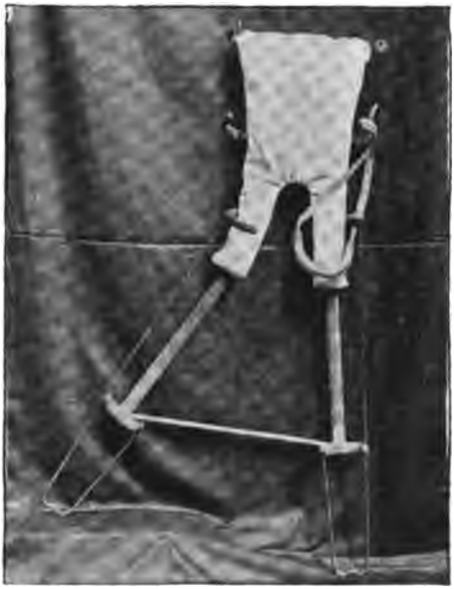

FIG. 5.—Abduction splint.

Where deformity is present to a lesser extent, it is sufficient to place the patient on an abduction frame. The splint is very simple, and effectually combats any adduction of the limb (Fig. 5).

Before leaving the subject of deformities, may I say that one of the common errors committed by the surgeons called upon to examine a hip-joint is to discard the use of a measuring tape; yet, for a correct record, this homely article is all-essential. My Trans-Atlantic colleague, Dr. Ridlon, united with me some years ago in emphasizing the necessity of determining the nature and degree of the deformities accompanying tuberculous disease in the various joints, and I venture as regards the hip to reiterate the advice we gave.

Outward rotation or eversion of the limb is associated with abduction, and inward rotation with adduction. The cause of these malpositions has not been absolutely determined, but it would seem probable that the patient assumes the attitude of greatest comfort, whether lying, sitting, or standing, and this strongly influences the deformity in the early stages of the affection. Later, the malposition is determined by the unbalanced force existing between the opposing groups of muscles in their effort to immobilise the joint, or between the muscular groups on the one hand and the mechanical device employed in the treatment of the disease on the other hand.

Shortening may be either actual or practical. Actual shortening is due either to arrested growth, to actual bone destruction, or to partial or complete subluxation. None of these conditions are found early in the disease, but an accurate record should be kept, for in this way the prognosis as to the ultimate length of the limb can best be judged. Practical, or false shortening, is due to adduction or flexion, or both. It is from the relation of the actual to the practical shortening that we conveniently compute the degree of adduction.

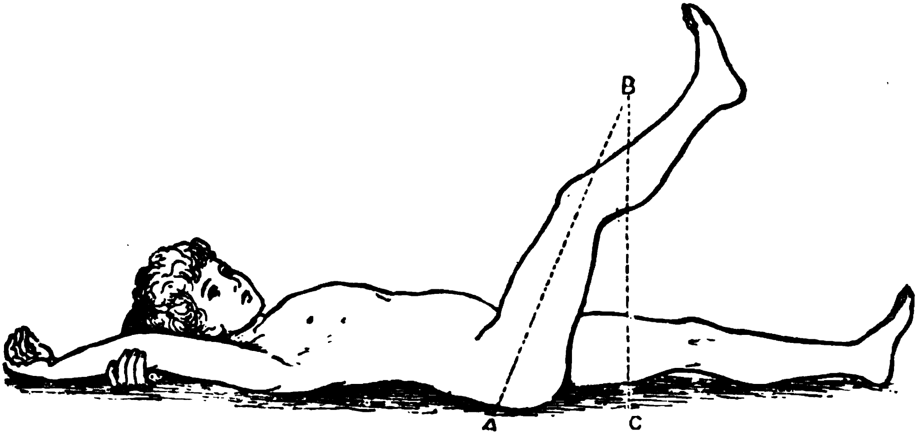

Fig. 6.—Method of estimating flexion angle.

The extent of flexion caused by the deformity may be estimated in the following manner. Whilst the patient is on his back, on a table, the surgeon lifts the diseased limb until all lordosis is corrected, and the pelvis is in a normal position (Fig. 6). He applies a tape-measure along the outer border of the limb in a line with the femur, commencing at a point where it diverges from the table. He measures the length to any point, and the length of a perpendicular from that point down to the table.

Lovett's Table.

Difference in Inches between Real and Apparent Shortening.	Distance between Anterior Superior Spines in Inches.																	
	3	3½	4	4½	5	5½	6	6½	7	7½	8	8½	9	9½	10	11	12	13
	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°
¼	5	4	4	3	3	2	2	2	2	2	2	2	2	1	1	1	1	1
½	10	8	7	6	5	5	4	4	4	4	4	4	4	3	3	3	3	2
¾	14	12	11	10	8	8	7	7	6	6	5	5	5	4	4	4	3	3
1	19	17	14	13	11	10	9	9	8	7	7	7	6	6	6	5	5	4
1¼	25	21	18	16	14	13	12	11	10	9	9	8	8	7	7	7	6	6
1½	30	25	22	19	17	15	14	13	12	12	11	10	10	9	9	8	7	7
1¾	36	30	26	23	20	18	17	15	14	13	13	12	11	10	10	9	8	8
2	42	35	30	26	23	21	19	18	16	15	14	14	13	12	12	10	10	9
2¼	—	40	34	30	26	24	21	20	19	17	16	15	14	14	13	12	11	10
2½	—	—	39	34	29	27	24	22	21	19	18	17	16	15	14	13	12	11
2¾	—	—	—	38	32	29	27	25	23	21	20	19	18	17	16	14	13	12
3	—	—	—	42	35	32	29	27	25	23	22	21	19	18	18	16	14	13
3¼	—	—	—	—	39	36	32	30	27	26	25	22	21	20	19	17	15	14
3½	—	—	—	—	—	40	35	33	30	28	26	24	23	22	21	19	17	16
3¾	—	—	—	—	—	—	38	35	32	30	28	26	25	23	22	20	18	17
4	—	—	—	—	—	—	42	38	35	32	30	28	26	25	23	21	19	18

The decimal fraction obtained by dividing the length of the perpendicular by the length measured along the limb will give what mathematicians call the sine of the angle. By consulting a book of mathematical tables the angle is found. G. L. Kingsley measures a constant length of 24 in. along the thigh, and then publishes a table showing the angle corresponding to the length of each perpendicular. The diagram (Fig. 6) explains the direction of the lines for the purpose of estimating the flexion angle.

Kingsley's Table.

In.	Deg.	In.	Deg.	In.	Deg.	In.	Deg.
0·5	1	6·5	16	12·5	31	18·5	50
1·0	2	7·0	17	13·0	33	19·0	52
1·5	3	7·5	19	13·5	34	19·5	54
2·0	4	8·0	20	14·0	36	20·0	56
2·5	6	8·5	21	14·5	37	20·5	58
3·0	7	9·0	22	15·0	39	21·0	60
3·5	9	9·5	24	15·5	40	21·5	63
4·0	10	10·0	25	16·0	42	22·0	67
4·5	11	10·5	27	16·5	43	22·5	70
5·0	12	10·0	28	17·0	45	23·0	75
5·5	14	10·5	29	17·5	47	23·5	80
6·0	15	10·0	30	18·0	48	24·0	90

To measure for abduction and adduction, the method of R. W. Lovett of Boston is the readiest and best. The patient is made to lie straight with the legs parallel. The surgeon now measures for real and for false shortening. Real shortening is found by measuring from the anterior superior spine of the ilium to the inner malleolus on either side, and comparing them. False or practical shortening is estimated by comparing the distance between the umbilicus and inner malleolus on either side. Having obtained this information, we turn to Lovett's table. If the line which represents the amount of difference in inches between the real and apparent shortening is followed until it intersects the line which represents the pelvic breadth, we find the angle of deformity. If the practical shortening be greater than the real shortening, the diseased leg is adducted; if less than the real shortening, it is abducted. An example will serve to illustrate the method of using the table, *e.g.*, length (from anterior superior spine) of right leg, 23 in.; left leg, 22½ in.; length (from umbilicus) of right leg, 25 in.; left leg, 22 in.; real shortening, ½ in.; difference between real and practical shortening, 2½ in.; pelvic measurement, 7 in. If we follow the line for 2½ in. until it intersects the line for pelvic breadth of 7 in., we find 21° to be the angle of deformity; as the practical shortening is greater than the real, it is 21° of abduction of the left leg.

The importance of an accurate record of the angle of flexion and adduction or abduction is of the greatest importance. Upon it, and upon it alone at times, depends the diagnosis of the disease; and upon it depends the diagnosis of a cure in all cases resulting in ankylosis. A joint in which the angle of deformity is changing is capable, under proper treatment, of gaining a still greater degree of usefulness. In a case destined to result in ankylosis a cure is not effected until the angle of the deformity ceases to change.

Should abscesses present, what are we to do? In days gone by, I used to open up and drain nearly every abscess cavity I could find; this quite irrespectively of any symptoms that were present. A comparison of my operated-upon cases and those treated by more expectant methods convinced me of the value of leaving certain types of tuberculous collections alone as long as possible. I now leave these abscesses alone if they give rise to no symptoms. Generally speaking, they are harmless. They are only dangerous if infected from without or from within. It is a mistake to attach the clinical importance to a tuberculous abscess that we do to a collection of pus. The tuberculous bacillus is not pyogenic; the inflammation it produces runs to granulation tissue. If true suppuration occurs, it is due to a secondary infection. Many are the occasions I have interested my house-surgeon in the spontaneous disappearance of a large spinal abscess. Efficient fixation undoubtedly lessens the liability to their formation and facilitates their disappearance. In a well-immobilised spine, quite a large proportion of these abscesses disappear. Writers who do not observe it, do not wait sufficiently long. In the hip they are very apt to become nomadic; they change from residence within the joint to residence without. They become extra-articular, in the sense of having no connection with the joint. Often I have noticed collections having appeared from the joint, travel down the thigh, become isolated, and then gradually dwindle away. The process of absorption is not characterised by any clinical manifestation. I do not open tuberculous abscesses, not because I dislike a radical operation, but because an operation is necessarily incomplete and ineffective if it cannot remove the disease of which the abscess is but a symptom. If opening the abscess meant eradication of the disease, the problem would be solved.

In a number of cases the abscess is not absorbed but invades the skin. The longer such abscess is kept back the better for our patient. Abscess which forms early in tuberculous disease and is evacuated is, in my opinion, a more serious affair than the abscess which is treated in the later stage. When the skin reddens I make a small puncture, half an inch in length, or less, using the strictest precautions, scrupulously avoiding the Volkmann's spoon or irrigator, for I do nothing to interfere with the thick sac wall which provides so admirable a barrier against infection. If these abscesses be attacked in this way, the terrors of infection are assuredly much minimised, for a delay of many months in opening the abscess has given the hip or spine time to make progress, the supply of débris is shut off, and the long exhaustive discharge which follows early incision is curtailed. I have no conviction more settled in my mind than that of the value of a conservative attitude towards tuberculous abscess. When we remember that hospital surgeons, with all the facilities for the practice of a rigid asepsis, see only an infinitesimal proportion of these cases, and that the overwhelming number are in the hands of practitioners in slums and country places, handicapped by their environments, totally unable to insist on surgical cleanliness, the policy I advocate seems to me of great importance. My experience warrants me in saying that hundreds of children die in all parts of England, because we do not realise the many responsibilities involved in the routine opening of tuberculous abscesses.

If, however, with the presence of fluid, discomfort, pain, and temperature are present; if the patient rapidly or steadily declines in condition,—then I think the abscess may be suspected and attacked by good incision, bone searched for, and antiseptic irrigation adopted. Here there will be found a mixed infection, and surgical interference is urgent and is most effective when most radical.

It is of course necessary at times to open an abscess because of its geographical site. I have periodically operated and sometimes opened collections in the buttock, loin, or thigh, which from their position prevented the application of a splint. A retro-pharyngeal abscess demands immediate incision, preferably behind the sterno-mastoid. Evacuation is also needed in those rare instances where one finds spasmodic attacks of dyspnœa, and this is best done by costo-transversectomy over the articulation involved.

The dressing of abscesses amongst the poor is a great consideration, and I find nothing simpler nor more effective than pitch-pine sawdust, soaked in mercury. It does not cost a penny a pound, and can be prepared by any practitioner in a remote village. It can be kept upon an abscess before it opens, so that, if evacuation occurs spontaneously, the contents will be received into a sterile medium; and if carefully instructed, the intelligent poor, aided by boiled spoons, can themselves conduct the dressings. Such cases amongst the poor, out all day in the open, lying on a spinal carriage or a rug, do infinitely better than in the best equipped hospital wards. For years I have refused admission, into the Royal Southern, of all tuberculous cases for longer than is needed to correct deformity. Tubercle flourishes in city hospitals. Happily we have inaugurated in Liverpool a great scheme whereby this year we build on the banks of the Dee, facing the Welsh mountains, a country hospital for children, with an ultimate accommodation for 200 beds, no time limit, with every facility for medical and surgical treatment in sunshine and pure air. This is a departure sure to succeed, which should be followed by every large city, for nothing is more distressing to the surgeon than helplessly to watch these children drifting from one institution to another, until their disease ends in crippledom or death.

In the case of the hip the splint is kept on until consolidation of the structures is apparent, all deformity has disappeared, and the pelvis lowered on the diseased side. Abduction should always be aimed for to compensate for shortening; the abducted limb being gradually brought towards the sound side and the double frame changed for a Thomas hip splint. There may still be a sinus discharging, but that need not trouble. Walking should be allowed, aided by patten and crutches, and by degrees, under appropriate supervision, restraints should be removed and tests for recovery from time to time employed. It may be opportune here to refer to the tests for recovery, a subject upon which our text-books are chiefly silent. A joint is cured of disease where the range of movement does not diminish by use; and in those cases resulting in ankylosis, a joint may be pronounced well where the angle does not change after use.

Let us take the elbow-joint as an example. The little patient has his arm slung up at an acute angle. All pain has gone, the swelling is diminished, and no active symptom is demonstrable. The surgeon ventures, therefore, to drop the arm in the sling 2 or 3 in., and carefully notes the result. If on his next visit, a week later, the patient is able to voluntarily raise his arm to the position from where it was lowered, recovery is assured and greater liberty may be given. If, on the contrary, the elbow has become stiff in the lowered position, rest has to be prescribed still longer. In the one case the range of movement does not diminish by use, in the other it does. The principle is applicable to all joints. In the case of the hip the most convenient test is that of flexion. If the patient leaves with a flexion angle of 10 per cent., and comes back with one of 15 per cent., then recovery has not taken place.

The hip splint is composed of wrought-iron, which must be sufficiently malleable to admit of being moulded into shape by suitable wrenches, and sufficiently unyielding to prevent any modification in shape by movements, voluntary or accidental, on the part of the patient. Most surgeons give their instrument-makers instructions to make the splint light and narrow, apparently unconscious of the fact that the bed, and not the patient, has to bear its weight. If the splint be made light, the patient usually soon distorts it, and is cured, if at all, in a deformed position, while motion is allowed to a joint which requires uninterrupted rest.

The splint (Fig. 7), which is covered with leather, consists of three wings, A, B, C (Fig. 7), and an upright or stem.

Wings.—The top wings extend two-thirds around the chest, at about the level of the nipples. The second extend two-thirds around the thigh, about an inch or two below the groin. The leg wings bear similar proportions, and reach lower than the middle of the calf. They should all be much more easily bent than the upright, and the uppermost should terminate in loops, meant for the reception of bandages, which extend from the top of the stem (Fig. 7, D), and round the shoulders.

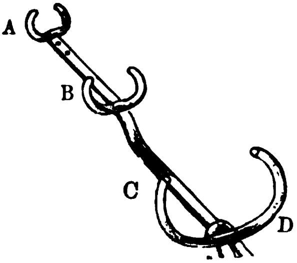

FIG. 7.

Upright or stem.—It consists of a body portion, a thigh portion, and a buttock bend. The body portion should be parallel to and longer than the thigh portion. This question of direction is extremely important, as any modification of it will invariably tend to the maintenance of deformity, and often to the production of pain. The incline in the buttock bend is invariable, and, in a case where a trochanter is enormously hypertrophied, it may almost be dispensed with. In that case the body and thigh portions are not merely parallel, but almost complete a straight line.

Measurement.—In measuring for a splint, the distance from the axilla to middle of leg should be stated, with the side affected.

Application.—The buttock bend (Fig. 9, A) should be *in situ* midway between the sacrum and the trochanter major. The body portion of the stem requires in every case a twist with the wrenches (Fig. 9). This will be readily understood when we recollect that it lies to one side of the spine against the chest, which is barrel-shaped, and the ribs are only thinly clad with muscles. If there were no twist, the inner edge of the stem would cause unbearable pain and soreness. The twist ends at the buttock bend, as the gluteal region is flat and fleshy. Fig. 9 shows the process of twisting a splint intended for the left side. The wings have been dispensed with for convenience of demonstration. Obviously the twist should be just sufficient to permit the chest-wall to lie in juxtaposition to the flat surface of the splint. It is important to remember that, in the majority of cases, there is a strong tendency for the splint to escape to the outer side of the diseased limb, and it is very necessary to counteract it. There are three principal ways of doing this, and in each the wings play their part. It is necessary to adopt a combination of the three methods rather than trust to any one. The methods are—(*a*) Making room for the body in a direction calculated to keep the splint towards the spine; (*b*) fixations of the inner wings; (*c*) special bandaging.

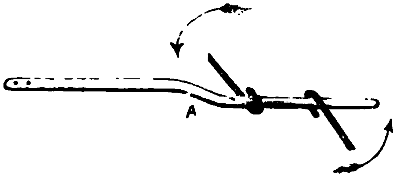

FIG. 9.

These preventives are fortified by another very simple expedient, which consists in making a small hole in the bandage and passing through it the outer of the thigh wings, and rolling it under the thigh and round the limb, so that a pull is instituted upon the appliance in the direction opposite to its tendency to escape.

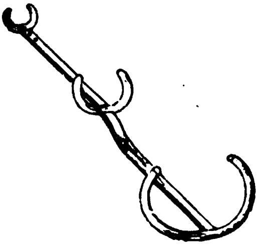

FIG. 10.—Incorrect model.

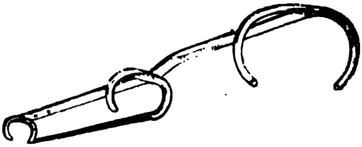

FIG. 12.

These three methods in combination render outward displacement impossible. And now is a favourable time to draw attention to the correct and incorrect methods of bending the body wings. As the chest is not quite circular, it is necessary that the body wings should not be made circular, else, in addition to grievous mechanical blunders, much soreness may result. The part upon which the patient lies, is but very slightly curved, and this allows the body to travel easily towards the outer side, which has been shown to be a mechanical necessity. Fig. 7, which is correctly modelled, may be compared with the diagram (Fig. 10), which represents the almost circular erratic body wings.

Where there is a tendency to abduction, combined with genu valgum—Fig. 12 displays a small bar of iron fixed from the tip of the outer thigh wing to that of the calf—the knock-knee can be bandaged to the outside bar, and the deformity gradually accommodated.

But we frequently have to combat a deformity requiring more watching than abduction, and that is adduction, where the body forms a concavity to the inner side of the stem, and where, in advanced cases, the stem lies altogether to the outside of the body. Fig. 8, which is a right splint, illustrates the manner of meeting this complication. The body wing to the inside of the disease is drawn well down, and pressed firmly against the body convexity, in order to get leverage upon the spine sufficiently low not to be counteracted by the mobile character of the vertebral column. Sometimes, with the same end in view, an additional wing is fixed, shown in dotted lines on Fig. 8. The outside body wing, to enhance the effect of its opposite, is drawn upwards to allow the body to return into normal shape.

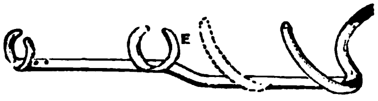

FIG. 8.

A splint may be either too large or too small, and it is important to modify or increase its length. This is quite simply done. If the splint is too large, draw both body wings towards the abdomen; if too short, draw body wings towards the neck. The dotted lines (Fig. 11) will illustrate this.

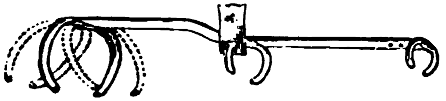

FIG. 11.

The most common errors result from making splints too light, and the following practical instructions may be useful:—

For an adult of about 6 ft., the upright should measure 1¼ in by ¼ in. For an adult of about 5 ft. 6 in., the upright should measure 1⅛ in. by ¼ in. For a youth or woman, the upright should measure 1⅛ in. by $\frac{3}{16}$ in. In a boy of 10 the upright should measure ¾ in. by $\frac{3}{16}$ in. For a child of 5, the upright should measure ½ in by ⅛ in. For an infant of 2, the upright should measure ½ in. by $\frac{3}{32}$ in. The wings should be the same width and about one-third of the thickness of the body wings.

The treatment of bony and fibrous ankylosis has constantly to be undertaken by the surgeon. If the ankylosis be sound, the task is easy, for so soon as the limb is straightened the trouble ends. By a sound ankylosis I mean an ankylosis which does not alter by use; an unsound ankylosis tends to increasing deformity, so that when mechanical or operative procedures have been adopted, recurrences have to be guarded against for varying periods. Although many joints recover movement, I prefer an ankylosis to occur in severe cases, especially in the hip, knee, and ankle. A firmly fixed joint is less subject to strain, and recurrence of disease is not likely to take place. In a bad tuberculosis, the result aimed at is an ankylosed joint in good position, and an operation for pseudo-arthrosis is not called for. Not so, however, if both hips are involved. Let us take, as an example, the case of a youth of 16, the victim of double coxitis resulting in double ankylosis with flexions and adductions. Walking consists in a rotatory movement of the body with advances in semicircles; or the patient will swing on crutches. In such a case I look for the side where the trochanter is highest above Nelaton. I saw through the trochanter on that side and overcome the flexion, divide the adductors if necessary, rotate the limb outwards, and place it well abducted. On the opposite side I make an outer incision, clear the bone, and either remove the head and neck, and part of the trochanter, or by means of gigle saw and chisel, take a piece out of the femur at its upper end. To prevent union, one can affix upon the cut surface of the lower end of the femur some metal foil or celluloid film, or better still, a screen of soft tissue, which the exposed structures will supply. The second limb is now extended and abducted. On the side where osteotomy has been performed, the fixation to be maintained for six or eight weeks; on the side where bone has been exsected, the limb should daily be moved once in every direction. Passive movements in this early stage are a mistake, and tend to irritate and stiffen; they should be postponed for five or six weeks. I have now operated upon a number of such cases, with gratifying results. During walking, the ankylosed limb is unsupported; but the exsected limb is placed in a calliper splint, and soon the patient moves about quite well. Such operations are not confined to children; I have often operated upon men and women of 30 or thereabouts. In children, one is careful, for obvious reasons, to sacrifice as little bone as necessary. Generally speaking, the problem of deformity is confined to one hip, where shortening of from 2 to 5 in. may be present. I have operated upon over 200 such youths, and can speak with enthusiasm of results. Many osteotomies, as we know, have been devised for the correction of a flexion deformity. Perhaps the most popular operation to-day, is that of Gant, the division being below the lesser trochanter. Although something must be said in favour of a section which cannot be interfered with by a shortened psoas and iliacus, yet

I have found that in cases of right-angled deformity of the hip, the upper part of the femur, left fixed after Gant's incision, has an ugly way of encroaching upon Scarpa's triangle.

With a view of not merely rectifying a flexion angle which has been the general object of a femoral osteotomy, but with the intention of lessening or obliterating adduction with pelvic tilting, I make my incision obliquely through the great trochanter (Fig. 14). This often involves hard work, because of the thickening and the sclerosed condition of the bone. To lessen my labour, I have added a small knob to the end of an Adams saw (Fig. 19). One can use more energy when there is no danger of transfixing tissues or dislodging the instrument. Where practicable, it is better to saw completely through the bone than only partially. One word of warning I may offer to those of limited experience in osteotomies of the upper femur. Deformities are so diverse, that great care is needed as to the direction of bony incision, for it is easy, unless one is very thoughtful, to introduce the saw into the pelvis. Make your incision through bone parallel to Poupart, and all danger is avoided. The adductors are now divided, and in a big boy traction is applied by means of pulleys. Very often a little may be gained by this direct traction. The leg, still fully extended, is placed in an abducted plane, and both the extension and abduction are maintained (Fig. 15). Union is completed with the leg abducted.

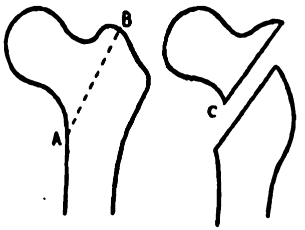

Fig. 14.—A, B, Line of section through trochanter; C, lengthening after traction.

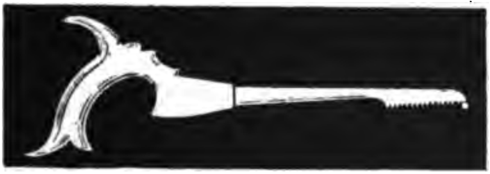

Fig. 19.—Small knob on end of saw to facilitate work.

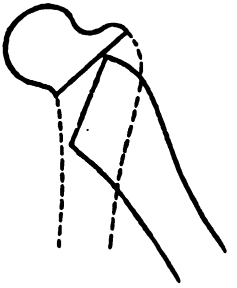

Fig. 15.—Position of fragments when limb is abducted.

The limbs will now be equalised in two ways: by lessening the practical length of the sound limb and increasing that of the short one. By osteotomy and extension, the leg is actually lengthened, and by the osseous union of the femur in abduction the elevation of the pelvis on the opposite

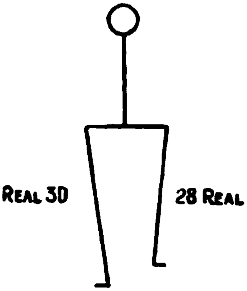

Fig. 16.—Showing 2 in. real shortening.

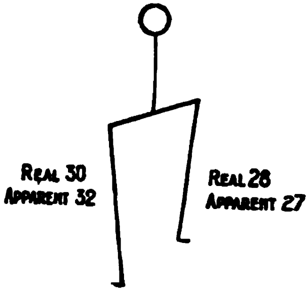

Fig. 17.—Showing real and practical shortening from pelvic obliquity.

side is controlled. With an outstretched thigh in one piece with the trunk, the limb can only be adducted by elevating the pelvis on the sound side, and in this way several inches of shortening may be remedied (Figs. 16, 17, 16a, 17a, 18, 20, and 21).

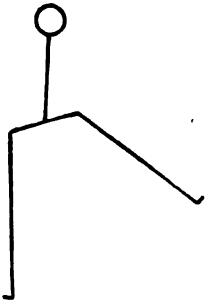

Fig. 16a.—Position of leg after trans-trochanteric osteotomy.

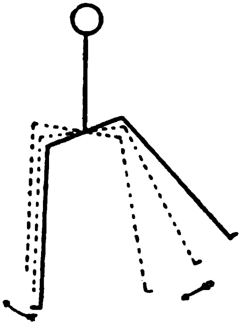

Fig. 17a.—Showing elevation of pelvis on sound side by bringing abducted leg into position.

A more difficult class of case to deal with is that where short and firm fibrous union obtains. In such cases I am accustomed to divide the adductors, and extend. If forcible abduction is difficult, I perform osteotomy as if for bony ankylosis. Such cases require to be kept longer in a splint; and if the limb be abducted for a sufficient length of time, say three to four months, further contractions are not likely to occur. We may look upon it as upon a surgical axiom, that a deformed limb due to arthritis retains the same amount of movement after the deformity is corrected as it possessed before, and that, if ankylosed at the moment of rectification, it is equally ankylosed when reduction is completed. After the removal of the splint, the patient should be confined to bed until the abducted limb is brought into position, and exercises should be prescribed, designed to elevate the pelvis on the sound side.

Active disease of the knee, with marked flexion, is placed in a Thomas knee splint, and can be straightened wholly, or in part at once, or by the pressure of pad. The leverage of combined pad and splint with the added weight of the limb is a much more potent rectifying force than the weight and pulley. Frequently, in neglected cases, we have to combat, in addition to flexion, a subluxation backwards of the tibia. This materially complicates the issue, if we resolve upon mechanical methods, for efforts at reduction often result in more complete displacement of the tibia. If care and time be taken, the deformity may be overcome by placing the patient to lie on his face with the anterior border of the tibia in juxtaposition to the table. The hamstrings, and if necessary the popliteal fascia, are divided, and the thigh extended. In this way the femoral condyles may be levered on to the tibial head; or a genuclast, which, while the knee is at right angles pushes upon the femoral condyles and pulls upon the tibia, may succeed. It is, however, a most obstinate deformity, and may require a V-shaped excision for its treatment. In the case of children, as I have said before, one scrupulously avoids unnecessary sacrifice of bone, but when in bony ankylosis an exsection is decided on, I take the precaution of making the apex of my V extend only four-fifths through the bone, and with a saw cautiously continue the section after the removal of the wedge. The knee is then acutely flexed, and the posterior aspect of the bone trimmed. All risk of wounding the popliteal vessels is in this way avoided, and if we take care that the flexion is entirely overcome, the after result will be good. If enough bone is not removed some flexion will remain, together with a straining of the popliteal structures which will threaten the vitality of the limb.

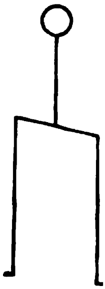

FIG. 18.—Showing final result with abduction of leg and elevation of pelvis of sound side.

It will be agreed that the prevention of deformity is of paramount interest, and it depends largely upon the knowledge and skill of the general practitioner. To him is given the opportunity of seeing these tuberculous lesions in their beginnings, and the course of events is largely influenced for good or evil by the steps he takes. It should be clearly stated that, whatever differences of opinion we may hold regarding treatment, given an early case, no appreciable deformities of the extremities should result. We can govern flexion, adduction, and rotation of the hip. We can control subluxation of the tibia; this does not admit of question. We can influence, only indirectly, arrest of growth, but we should always strive for the position of greatest utility. This, in the hip, is abduction and full extension; in the knee extension; in the ankle an angle of 95°; in the wrist and spine, hyper-extensions; in the elbow, usually an angle of about 40°.

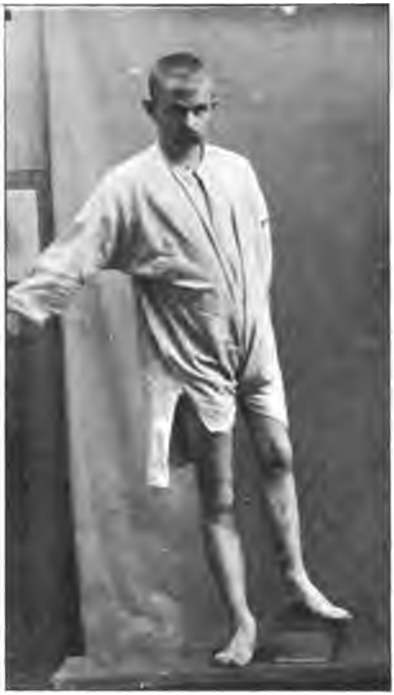

Fig. 20.—5 in. apparent shortening.

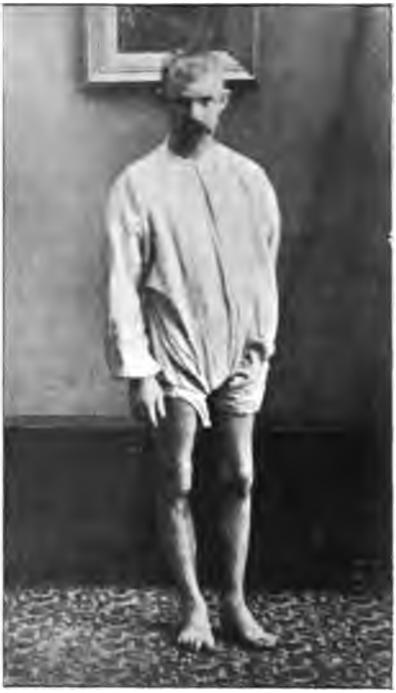

Fig. 21.—Same case rectified.

How often we notice the ankle stiffening in a position which prevents the heel from touching the ground. Nothing can be worse. At every step the patient takes, a cross-breaking strain is cast upon the weakened joint. Again, the hyper-extended position is of great importance in the treatment of the wrist, and yet invariably it is treated on a straight splint, which results in ankylosis in a flexed position. If one wishes to grip powerfully, the wrist is first instinctively extended. One cannot grip effectively with the wrist flexed. The lesson is obvious. If disease at the wrist results in ankylosis in the extended position, every advantage will accrue to the patient's grip. So true is this, that when a patient consults me complaining of faulty use of the fingers, should the wrist be ankylosed in the flexed position I attack the ankylosis by the wrench, and place the wrist in extension with happy effect.

Without entering into controversial matters in the treatment of spinal caries, one may say that, under the best available mechanical means in certain regions, it is difficult to influence curvatures. This is especially the case in the lower cervical and upper dorsal regions. Not so, however, in the dorso-lumbar area. Given an early case, one should fairly efficiently guard against a kyphos. The deformity arises, as we know, from destructive disease on the anterior aspect of the vertebral bodies, and a kyphos is due to a direct falling forward of the bone above the destroyed area. We should, therefore, counteract this by keeping the spine rigidly fixed upon a convex support; if this be done effectively, we need have no apprehensions of a serious deformity. The straight splint should be discarded.

In this address I have endeavoured to treat in a practical way some of the many problems connected with arthritis. I have simply told you what I do, without having time to enter fully into reasons. This is very unfortunate, but it is also inevitable. In so wide a field one can only present bare outlines, and the refinements of diagnosis have to be postponed. What I have said, however, is based upon an exceptional number of cases, and if I have been able to instil a spirit of hopefulness and conservatism into the minds of only a few, I shall be quite content.

May I thank you all for the compliment you have paid me in asking me to Edinburgh, and for your generous and patient hearing.

THE PRODUCTION OF ANÆSTHESIA FOR BRIEF OPERATIONS ON THE NASO-PHARYNX.

By THOMAS D. LUKE, M.B., F.R.C.S.Ed., *Instructor in Anæsthetics, Royal Infirmary, Edinburgh.*

THE operations included under this heading are the following:—Tonsillotomy, removal of adenoid growths, snaring of polypi, and removal of spurs on the septum, anterior and posterior turbinectomy, and draining the maxillary sinus.

Of these, curettage for adenoids is by a long way the operation most commonly done, and it is, I believe, generally regarded as the backbone of a laryngologist's practice. It is an operation which is performed, one may safely say, some hundreds of times daily, in private and hospital practice throughout the civilised world, and the choice of the anæsthetic is a matter of great moment. A special point to bear in mind is, that it is necessary to induce at the start an anæsthesia of sufficient degree to last out the whole operation, if possible; when this is attained, the anæsthetist has to remove the anæsthetic and hand the patient over to the surgeon. If an unusually extended period of anæsthesia is required, the administration can only be kept up by "dodging" the operator, so to speak, or, if chloroform be employed, by the use of a Junker's inhaler and tube. In this respect these operations differ from all others practically, except the extraction of teeth.

There can surely be nothing more astonishing than the great variance of opinion between different authorities in all departments of medicine and surgery, and we find the small domain of anæsthetics no exception; indeed, in this, widely different opinions are held, so different in many instances as to be diametrically opposite! Particularly is this the case in regard to the (1) posture of the patient, and (2) the choice of the anæsthetic in the operations under our consideration; and in some respects perhaps this is not to be wondered at.

We know that, as a general rule, the methods of treating any disease increase in arithmetical proportion to the difficulty in improving or curing the condition, and the more obscure the etiology or pathology of any affection, the greater the number of theories advanced as to its exact nature. Accordingly, if we bear in mind the very considerable risks, more than ordinary, to which the patient is subjected during anæsthesia, in some of the operations which we are at present treating of, we cannot so much wonder at the great variety of methods proposed, with the idea of a satisfactory performance of them during a safe and sufficient anæsthesia.

It may be well to briefly indicate the exact nature of the chief risks involved—

1. Aspiration of blood or of portions of the growths removed into the respiratory passages, which may immediately produce asphyxial symptoms, or, later, a pneumonia or bronchitis.

2. Irritation of the vagus nerve through laryngeal branches: (*a*) By chloroform vapour, concentrating over the glottis during the operation, when the throat is so far occluded by the surgeon's fingers, instruments, or blood and mucus, and a deep inspiration or gasp being suddenly taken after temporary respiratory arrest. (*b*) By transference of impulse from the glosso-pharyngeal nerve, etc., to the vagus, causing arrest of the heart or breathing.[1] This occurs during light chloroform anæsthesia, and is therefore more likely

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[1] Crile suggests and uses cocainisation of naso-pharynx with ½ per cent. solution cocaine, prior to general anæsthesia, to lessen risk of reflex troubles.

to be seen in adenoid operation (where we must retain the cough reflex throughout) than in most others. Hewitt says: "In certain subjects, more especially the obese and the muscular, the commencement of an operation during moderate anæsthesia is strongly to be deprecated, owing to the reflex suspension of breathing which may result . . . . often erroneously regarded as primarily cardiac."

3. Accidents have from time to time occurred from the breaking of instruments, such as curettes, etc., and the fragments passing down the air passages.

I. THE CHOICE OF THE POSITION OF PATIENT.—1. *The dorsal posture* (*Rose's position*), with the head extended over the end of the operating table. This is rather a favourite method, and, taking all things into consideration, may be regarded as the most advantageous as regards the anæsthetic, next to the lateral posture, which many operators, however, do not consider so convenient. The risk of blood or portions of the adenoid growth falling into the larynx is infinitesimal. If the operator is reasonably dexterous, and sponging is carefully and thoroughly carried out (this being a most essential factor for safety), time is not afforded for sufficient blood to accumulate to reach "the high-water mark" of the rima glottidis, if the expression may be used, and fill up the whole naso-pharynx. Before this can occur the patient is drawn up on the table, and turned to the right or left side, with the head somewhat raised, so that ample drainage is provided, as in cases where the lateral position is adopted from the first. The chief disadvantage is that some obstruction to the venous return is produced, if the head be hyperextended; and to prevent this, in some cases, it is advisable for the anæsthetist to support the occiput slightly with one hand,[1] while retaining the gag in position with the other. To effect this, however, and continue the sponging at the same time, is rather difficult.

2. *The lateral posture.*—The patient lies on his side with the knees flexed and the upper limb slightly in front of the lower; by this means the patient is prevented from rolling on to his back, and a slightly forward inclination is given to the whole body. As far as the anæsthetic is concerned, this posture is certainly the most advantageous, since any embarrassment of breathing from the blood in the throat is prevented, as this gravitates on to the dependent cheek and can readily be removed.

3. *Dorsal posture.*—With the head but not the shoulders slightly raised by means of a small cushion or pillow. The objection to this posture is that there is no provision made for the escape of blood by gravitation, and it is absolutely of vital importance to carry out the most assiduous sponging, which, of course,

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[1] In the *Brit. Med. Journ.*, London, April 30, 1904, Dr. F. A. Nyulasy of Melbourne suggests a simple rest for the head-clamper, to the end of the operating table, and the idea seems excellent.

the anæsthetist's hands are free to effect. The head must never be allowed to become extended, and if the hæmorrhage is at all free should be turned to one side.

4. *The sitting-up posture.*—If gas and ether or ethyl bromide is used as the anæsthetic, this position is almost invariably adopted, and finds favour with many surgeons. It is, of course, absolutely unsafe to use chloroform with the patient in this position, unless preceded by a full dose of ether, which sequence is favoured by Hewitt. In some of the German clinics, however, chloroform is frequently used *per se* in this manner, only a very light anæsthesia being produced, and thus two generally recognised first principles of chloroformisation disregarded.

II. The Choice of the Anæsthetic.—The anæsthetic agents at our disposal are ethyl chloride, ethyl bromide, nitrous oxide, ether, chloroform, and various combinations of these.

1. *Ethyl chloride.*—The best and most useful anæsthetic which we possess for surgery of the naso-pharynx is undoubtedly our new ally, ethyl chloride. The extraordinary rapidity with which consciousness is lost and anæsthesia induced by means of it, the almost invariable absence of struggling if the administration is properly conducted, the suitable duration of available anæsthesia (about ninety to two hundred and fifty seconds, according to the amount used and the length of inhalation), the rapid recovery of the patient and the comparative freedom from vomiting, all recommend it in the strongest manner to the laryngologist, while its splendid record as regards safety[1] recommend it to all concerned. The technique of its administration is extremely simple, and both the drug and the inhaler very portable. The average time required to induce anæsthesia for adenoid cases is about ninety seconds. The drug is so largely used now in almost every throat and ear hospital throughout the kingdom, that it should be regarded as the routine anæsthetic for adenoid operations, whether tonsils are to be removed or not. It may be safely said that a surgeon, unable to deal with an ordinary case of this nature, in the time afforded by an average administration of chloride of ethyl, is not fit to operate on such cases at all. There are, of course, exceptionally difficult cases, which crop up from time to time, but, taking the average case, I scarcely think this statement can be said to be wide of the mark. A skilled administrator can add considerably to the length of the anæsthesia, by pushing the drug up to the safety limit, getting the pupils fairly dilated, and the breathing stertorous, before handing the patient over to the operator, and so obtaining two and a half to three minutes of workable anæsthesia, if necessary.

It has been objected that with this anæsthetic the time occupied over the procedure, as a whole, in a private house, seems unduly short, and the patient's relatives may think the operation more trivial than it is, or imagine it has been hurried over. But such an objection can scarcely be seriously advanced, for the skill of the surgeon is shown by the very rapidity with which the operation is completed. It remains to be proved that recurrences are more frequent after an operation done under ethyl chloride than where any of the less volatile anæsthetics are used; and all intelligent patients, at any rate, will be duly grateful for the assurance beforehand, that there is practically no risk in connection with the anæsthetic, and the speedy manner in which any misgivings they may yet have are set at rest by the completion of the operation. It will be a bold man who will make such an assurance where chloroform is to be used. One slight drawback which the drug possesses, lies in the fact that it does not cause relaxation of the masseter muscle, but the reverse, and this necessitates the insertion of the gag (Probyn Williams' modification of Doyen's is the best), or of a small mouth prop prior to the commencement of the operation, as some valuable time may be lost in opening the mouth later. Young children who are fractious will purposely or accidentally allow the prop to become misplaced or fall out, and then a small wooden wedge serves to separate the jaws for the insertion of the gag.

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[1] Seitz, on April 1902, estimated mortality as 1-12,000; it is probably much lower than this, calculated on the results of the past two years. The chloroform mortality in *general* surgery is at least 1-1300, and ethyl bromide 1-4000.

2. *Ethyl chloride, followed by ether.*—This combination is very much to be preferred to "gas and ether," as causing no cyanosis and less congestion of the fauces, etc. Less ethyl chloride is needed than when that drug is used alone, 3 to 4 c.c. being sufficient; and after allowing forty-five seconds inhalation of this, the ether should be rapidly turned on and about six full breaths of it allowed, with or without the bag. This combination is advantageous when the operation is unusually long or difficult or complicated, and the surgeon wishes the patient's head to be raised. Further, with it the jaw muscles are completely relaxed.

3. *Ethyl bromide* has of late years been brought rather prominently before the surgical world by Turnbull and Bishop in the United States, by Kocher on the Continent, and in this country by Brown Kelly of Glasgow, who has used it very extensively—over 1600 times—and almost to the exclusion of other anæsthetics, in the removal of adenoids. For this purpose it is remarkably well adapted; and in many of the cases for which I have employed it, the ease with which anæsthesia was induced, and the good working period afforded, was very satisfactory. But no one who has used ethyl chloride a few times can fail to be struck with its superiority in almost every respect, so that personally I have given up using ethyl bromide entirely. Its advantages and disadvantages may be briefly summed up as follows—

Advantages of ethyl bromide.—(1) The administration is exceedingly simple, and no special apparatus is required. The technique is mastered after having experience of six or eight cases.

(2) The length of the anæsthesia is well adapted to the operation for adenoids, the patience regaining his consciousness and ability to cough and clear his throat, just at the conclusion of the operation if it be dexterously performed.

(3) The rate of mortality, while higher than that of ethyl chloride considerably, is much lower than that of chloroform.

(4) Saving of time, both in induction of anæsthesia and recovery, a matter of considerable moment in hospital practice.

Disadvantages.—(1) The "étouffant" method of administration is a serious drawback with nervous and delicate patients, while I have known alcoholic patients become very violent during the period of induction.

(2) All bromine compounds have a more lasting and toxic effect on the tissues than the chlorine compounds (Binz).

(3) Unless the drug is prepared with unusual care, decomposition occurs, if it be kept for any time exposed to light, and free bromine is given off.

(4) After-sickness is frequent, occurring in 55 per cent. of cases, according to Brown Kelly.

(5) A garlic-like taste and smell trouble the patient in many cases for days after the operation.

4. *Nitrous oxide* is without doubt the safest anæsthetic which we possess. It is peculiarly adapted to the requirements of the dental surgeon, but has many drawbacks for the operation at present under our consideration. In the first place, the available anæsthesia is far too brief for a really satisfactory removal of the adenoids, for any but an extremely rapid operator who is well accustomed to working with this anæsthesia. I make this exception more out of deference to the opinions and practice of others than from personal conviction. This anæsthetic has been used, as a matter of routine, at the Metropolitan Nose and Throat Hospital and the Central London Throat Hospital for about fourteen years, for children from 4 to 12, and many adults; and many thousands of cases have been satisfactorily dealt with, in that there has been no unusual percentage of recurrences. Mr. Watson Williams advocates the use of nitrous oxide, and the late Mr. Lennox Browne was a strong advocate of it, so that, in face of this expert opinion, it would be an impertinence for me to entirely condemn its use; but my own view is, that it is a very unsuitable anæsthetic for this purpose, and especially so for operations in private.

The available anæsthesia averages, according to Hewitt, 30·3 seconds; and it is obvious that the curetting must be hurried over, or a number of the patients must feel the concluding manipulations of the operator when in a semi-anæsthetised condition, a sensation, by the way, far more disagreeable than when fully possessed of one's faculties. In the first instance, if the surgeon be anything less than unusually dexterous, "tags" of lymphoid tissue will be left, to the future sorrow of, at least, the patient. Further, patients suffering from any form of respiratory obstruction, not excluding the naso-pharynx, are not good subjects for "gas," as they rapidly become cyanosed, stertorous, and affected with jactitation or clonic muscular spasm, while the period of anæsthesia available under normal conditions is considerably curtailed.

5. *Nitrous oxide and oxygen.*—If nitrous oxide be employed, it is best combined with oxygen, for thereby the anæsthesia is prolonged and the asphyxial phenomena largely eliminated. The length of the anæsthesia afforded is, on the average, forty-four seconds. Young children, however, are not suitable subjects for this combination, as with them spasm of the larynx and chest muscle are prone to arise, leading to pulse failure and alarming syncope (Bellamy Gardner). But apart from this the apparatus is extremely cumbersome and bulky to carry, and the two distended bags are distinctly disquieting to the already nervous subject of the operation.

6. *Nitrous oxide and ether*, administered by means of Hewitt's apparatus, has been much employed in some of the Metropolitan hospitals, and with success. At the same time, this combination is open, to a certain extent, to the same objection as nitrous oxide alone, from the presence of nasal obstruction. The patients cough and choke and become readily cyanosed, and excessive secretion of mucus will add to the operator's difficulties in some cases, particularly if the tonsils be enlarged. When giving anæsthetics, more especially gas, and gas and ether, to patients who are to be operated on some other region than the throat, one is frequently able to diagnose with precision that they have enlarged tonsils or adenoids, from the manner in which they behave under the anæsthetic. One would naturally expect greater hæmorrhage when either ether or gas is used, but on this point it is difficult to speak definitely, as one is unable to judge with any degree of accuracy the relative amount of bleeding when it is in any case so very profuse. The amount of bleeding under ether varies immensely in different cases, but there are undoubtedly some cases which bleed very freely until the hæmorrhage is controlled. Excess of bleeding adds, in a degree, to the risk of the operation, so that this effect of ether, even if only occasional (taken along with the secretion of mucus of a tenacious glairy character, specially apt to occur in these cases), constitute two drawbacks, which cannot altogether be put aside, to the use of this elsewhere very admirable anæsthetic. However this may be, Buxton, W. R. H. Stewart, Rickard Lloyd, and many other well-known experts in the Metropolis, have used either "gas and ether" as a routine anæsthetic for a number of years, and speak well of it.

Ether given alone is open to the same objections as the gas and ether combination, and in some respects to a more marked degree. Induction is necessarily somewhat slow, and during this period the irritation of the pungent vapour will often set up coughing and cause congestion of the naso-pharynx, which is better avoided. When ether is used, it should, like chloroform, be preceded by another anæsthetic which produces loss of consciousness and dulls the reflexes.

7. *A.C.E. or C.E. mixture* has been largely used for these operations, and little objection can be taken to it. The induction of anæsthesia is somewhat slow, and it is therefore not adapted to hospital practice; but in private practice, if ethyl chloride is not available, it is the next best thing, and is certainly much safer than chloroform and preferable to ether in other respects.

8. *Chloroform.*—Until the advent of ethyl chloride, chloroform was, in many ways, the best anæsthetic for these operations. Regarding it Kendal Franks says: "The certainty that the growths have been efficiently dealt with quite outweighs the inconvenience which follows or accompanies chloroform administration; but experience in the administrator is essential, and I know of few operations making a greater claim on his coolness and skill."[1]

Sir Felix Semon says: "The desirable thoroughness I have in view (in removing adenoid growths) can only be obtained, as far as I see, by the operator not being unduly hurried by the brief duration of the anæsthesia, nor by the fear of anything untoward during the operation itself. If chloroform be selected as the anæsthetic, and quietly and slowly administered by a competent anæsthetist, and never pushed beyond the abolition of the cough reflex, it introduces, to the best of my knowledge and experience, no amount of danger into the operation."

These are strong statements in favour of chloroform; but against them is opposed the melancholy fact that, since the autumn of 1897, considerably over thirty deaths have been recorded from chloroform administered for adenoid operations alone, some of them we are safe to assume in the hands of skilled chloroformists; while, on the other hand, there are no deaths recorded during that period, so far as I am aware, which occurred during this operation when any other anæsthetic was administered. It is difficult to get over facts like these, even when the drug we are considering is extolled by special pleaders or by those who in a large experience have never met with a fatality.

Since the advent of ethyl chloride the large majority of throat surgeons and anæsthetists agree in either condemning or avoiding the use of chloroform for adenoid operations, while, in those exceptional cases where it may be necessary, it is always best to precede it by ethyl chloride or ethyl chloride ether sequence, and, if necessary, prevent the anæsthesia becoming too light during the performance of the operation by the use of a Junker inhaler and a throat tube.

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[1] *Trans. Roy. Acad. Med. Irel.*, 1894.

It is unwise to forget that with chloroform we invariably face the risk of one of those terribly sudden fatalities from primary cardiac failure, or "lightning syncope," due to some unexplained action of normal doses of chloroform on the nervous mechanism of the cardio-vascular apparatus. Some have attributed these deaths to vagus inhibition during light anæsthesia (the occurrence of which so eminent an authority as Dr. Hewitt doubts), and others to irritation of branches of the vagus in the glottis, etc., by too concentrated a vapour of chloroform (Embley); but whatever the physiological cause may be, these deaths occur and occur again, and neither the pathologist nor physiologist avail to prevent them. But the practical lesson, which he who runs may read, is that, in spite of the extreme value of chloroform as an anæsthetic agent in many surgical operations, we are wise if we avoid it where possible, at any rate for such operations as we are discussing, while, if it is essential to eventually employ it, anæsthesia should be started by some other means.

In cases where parents and relatives beg that we "will give *it* on a handkerchief," and object to the use of a face-piece, etc., as terrifying and "suffocating," it is surely wrong and weak not to take a firm stand, and, explaining as briefly as possible the facts of the case, insist on observing one's own discretion as to the means adopted to obtain anæsthesia.

GENERAL CONCLUSIONS.—My own view as to the best posture in operation for adenoids is that Rose's position is the safest and most convenient both for anæsthetist and surgeon. As Kendal Franks remarks, "If Rose's position be adopted I cannot understand how blood can possibly get into the larynx, *if we only sponge carefully.*" As regards the anæsthetic—

1. For adenoids alone, ethyl chloride should be used as the routine agent. Nothing more is necessary as regards the duration of anæsthesia, and the use of chloroform can only be rendered necessary by some exceptional conditions, such as extreme dyspnœa in the patient, or ethyl chloride being unprocurable.

2. For adenoids and tonsils, in the very large majority of cases ethyl chloride will again be sufficient in every way. In operations of this nature, where there is such abundant hæmorrhage that speed in operating is all-important, and dalliance is both annoying to the person responsible for the anæsthetic and bad for the patient.

3. For removal of polypi, septal spurs, turbinectomy, ethyl chloride will often be sufficient again; but for certain cases a longer anæsthesia may be required, especially when any of these conditions coexist with tonsils and adenoids; and in such cases a sufficient anæsthesia can always be obtained by means of the

chloride of ethyl and ether sequence, or chloride of ethyl followed by C.E. mixture. If chloroform be used, it should be preceded by ethyl chloride and ether, and only sufficient given to keep the patient between the second and third stage of anæsthesia with both conjunctival and laryngeal reflex present.

In conclusion, I most cordially agree with Mr. Silk, who lays great stress on the importance of the surgeon and anæsthetist being accustomed to work together, and so knowing each other's requirements and methods.

Only with such conditions can the best results be obtained.

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INTESTINAL OBSTRUCTION.[1]

By Rutherford Morison, F.R.C.S., *Surgeon to the Royal Infirmary, and Consulting Surgeon to the Dental Hospital, Newcastle-on-Tyne.*

Complete Operations.—3 cases; 2 recovered, 1 died.
Enterostomy.—3 cases; 1 recovered, 2 died.
Cæcostomy.—6 cases; 5 recovered, 1 died.
Left Inguinal Colostomy.—4 cases; 3 recovered, 1 died.
Lateral Anastomosis.—8 cases; 7 recovered, 1 died.
Enterostomy (Secondary).—2 cases; 2 recovered.
Enterotomy.—2 cases; 2 recovered.
Resection.—7 cases; 2 recovered, 5 died.
Total 35.—Recoveries 24, Deaths 11.

There is no problem in the diagnosis of abdominal lesions more difficult to solve, than that afforded by some occasional cases of intestinal obstruction.

The majority of acute abdominal lesions are ushered in by similar symptoms; for example, perforation of any of the viscera, attacks from gall or kidney stones, cholera, ovarian cyst with twisted pedicle, leaking ectopic gestation, and certain kidney cases.

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[1] Statistics supplied by G. Grey Turner, Surgical Registrar, Royal Infirmary, Newcastle-on-Tyne, of cases of intestinal obstruction operated upon by Mr. Morison during 1903 in the Infirmary and private Hospital.

The first question requiring answer in all such is therefore—

1. IS THIS CASE ONE OF INTESTINAL OBSTRUCTION?—If a patient, previously in good health, has been suddenly seized with abdominal pain which is aggravated by frequent griping paroxysms, if vomiting is an urgent symptom, and if there is entire inability to pass flatus, it is safe to assume that the case is one of intestinal obstruction. In the case of a strong man, inured to hardships, with strong will-control and abounding energy, the symptoms will be less pronounced than in the case of a sensitive woman or a young person, and the initial symptoms in the elderly, if serious, must have more than usual weight attached to them.

The next proceeding is to make a complete examination.

The patient should lie in an easy posture, with raised shoulders and with the abdomen fully exposed in a good light.

First examine the hernial sites.—The importance of this rule cannot be overrated, for I still frequently see lives sacrificed by its neglect. Not only the ordinary, but the extraordinary hernial sites as well, should be scrutinised; and in the male it is well to observe if both testicles are present in the scrotum, for a strangulated hernia in cases of undescended testicle may be hidden in the inguinal canal. If a hard tender swelling be found in one or other of the hernial sites in an obstruction case, it is necessary to believe that this has everything to do with the illness, until the contrary is proved by operation.

Exposure of the abdominal surface to the cool air may cause visible intestinal movements, and these are the most conclusive evidence of intestinal obstruction.

The whole abdomen must be systematically and carefully inspected, palpated, and percussed, then the examination will be concluded by rectal examination (which should never, under any circumstances, be omitted), and in women by a vaginal examination, when feasible.

2. WHERE IS THE BLOCK?—This is a much more difficult question to answer at the bedside than is suggested by text-book statements, and in a considerable percentage of cases it is impossible to give a reasonable opinion. It is of the utmost importance to know whether the lesion involves the small or the large intestine. Acute obstruction is more likely to be situated in the small than in the large intestine; but the notes of my cases show many exceptions, which prove that this cannot be laid down as a definite rule.

The age of the patient may be a useful guide, for before 40 the chances are in favour of an obstruction in the small, after 40 in the large intestine. The reason for this is that malignant stricture of the colon is one of the most common causes of obstruction, and though there is no age exempt from malignant disease, it occurs infrequently before 40. It has to be remembered, however, that apart from this fact, age has some relation to the character of the attack. An obstruction which would have caused the most acute symptoms in youth, may be attended by relatively mild symptoms in aged persons. Indeed, a malignant stricture of the colon in a young subject may be the cause of acute and rapidly fatal intestinal obstruction, for I recently saw a post mortem examination on a man under 30 who was admitted to the Infirmary moribund from an acute abdominal illness of five days' duration; and post mortem examination showed that his death was the result of acute intestinal obstruction, due to a malignant stricture at the lower end of the sigmoid flexure. In most of these cases, however, the rapidity of their course is not due to age, but is best explained by the fact that the small intestines are distended. This, I believe, arises from the anatomical condition of the ileo-cæcal valve. If it can resist the backward pressure of gas and fluid fæces, the large intestine alone is distended, and the course is chronic; if, on the other hand, the ileo-cæcal valve is incompetent, the small intestines dilate and the course is acute. A limited post mortem experience supports this view, which requires further confirmation.

Localised pain may be a guide to the site of obstruction, if observation of it be made quite early in the case. Very soon the pain is referred to the neighbourhood of the umbilicus. In chronic obstruction the patient may feel pain, which begins or ends at one spot, and the rumbling of flatus may be felt by the patient to stop there. Vomiting, in the case of obstruction of the small intestine, is more obstinate and sooner becomes fæcal in character than when the obstacle is in the large intestine, when vomiting is often a late symptom and rarely fæcal.

The shock following acute obstruction is greater in the case of the small intestine. Anuria occurs in some cases of chronic obstruction in the small but not in connection with the large intestine. If an enema of nearly a quart cannot be retained, this fact is in favour of an obstruction low down in the large intestine.

The shape of the abdomen may be an aid in forming an opinion as to whether the obstruction is situated in the small intestine or in the large intestine. If the small intestine is involved low down, abdominal distension is most marked in the centre, giving the abdomen a similar contour to that produced by an ovarian cyst. If the obstruction is in the large intestine the abdomen bulges at the sides as in ascites, and may be enormously distended. A most useful sign that the large intestine is involved is the fact that the cæcum is distended; for then it is certainly known that the obstruction is below this point. In some cases the distension is quite evident. The right side of the abdomen may be bulging and the left flat, or the outline of the cæcum may be clearly mapped out through the parietes. If the distended cæcum can be seen to swell up and to contract intermittently with the passage of a peristaltic wave upwards along the colon, and if it can be felt to harden at the same time, and if there is splashing in it on succussion, the evidence that there is obstruction somewhere in the colon is complete. It is only safe to say, somewhere in the colon; for I have learned that distension of the cæcum has but little localising value as to the position of the obstruction. The contents of the whole colon are liable to be emptied into and to distend the cæcum, leaving the rest of the colon empty, possibly contracted; and it may be of the greatest practical importance to realise this fact (see Case 12).

On inspection, the ladder-like arrangement of the distended intestines, described by Professor Wyllie, may be seen in some chronic cases, and this is an important aid to localisation, for it occurs only when the small intestine is involved.

On palpation, a tender spot may indicate the site of obstruction, and becomes of great importance if a swelling or feeling of resistance, or a temporary tumour can be felt there during an attack of vigorous peristalsis (see Case 3).

Very firm and painful contractions, in which the intestine becomes as hard as the contracting uterus, occur, so far as I have seen, only when the small intestine is concerned; the colon and the stomach contract more feebly than the small intestine does.

The sign to which we attach greatest importance in the diagnosis of intestinal obstruction is increased peristalsis, which careful examination will discover early in all cases. Without visible, palpable, or audible increase of peristaltic movements in the intestine, the diagnosis of obstruction is unlikely to be right; when these are present it cannot be wrong.

WHAT IS THE NATURE OF THE OBSTRUCTION?—In children, intussusception is the cause in the majority of instances; in young adults, adhesions, most frequently the result of tubercle; in patients over 40, malignant stricture of the large intestine.

Intussusception.—The attack is often preceded by a free intestinal evacuation. There is sudden pain, continuous at first, becoming more markedly intermittent later on. Vomiting is not so severe or so persistent as in other acute cases, constipation is not likely to be complete; it is usual to have small loose motions with muco-sanguinolent discharge and marked rectal tenesmus. The finger used for examination of the rectum is apt to be blood-stained on its removal. The abdomen is seldom much swollen; indeed, it may be retracted, because distention is prevented by the frequent escape of small quantities of gas per anum. Examination of the abdomen may discover in the right iliac fossa, or somewhere in the course of the colon, a rounded sausage-shaped tumour which hardens and relaxes. Per rectum a swelling may be discovered resembling the uterine cervix, or if the tumour is too high for this, bimanual examination may reveal its presence.

In young children the diagnosis may be rendered difficult by the apathetic condition sometimes seen in them. There may be no striking abdominal symptom except vomiting, and the patient lies in an apparently anæsthetic condition, tolerating rectal and abdominal examination without complaint. The ease with which the relaxed and anæsthetic abdomen then allows of examination makes the discovery of the tumour easy.

Cases of strangulation by bands, diverticulum rings and internal hernia, are often sudden in their onset, and produce very acute symptoms. A history of previous peritonitis suggests strangulation by a band or by adhesions (see Cases 4, 5, 24). If there is no such history, the possibility of a Meckel's diverticulum should be borne in mind.

Strictures are generally malignant, and are most frequently met with in the sigmoid flexure of patients past 40. Their usual history is of attacks of constipation, at first yielding to mild purgatives, but gradually requiring stronger measures. A very suggestive history is that purgatives caused so much intestinal commotion that any one in close proximity to the patient could hear loud rumblings. If abdominal examination does not find any tumour in the colon, rectal and vaginal examination may. A growth in the slack of the sigmoid flexure makes it heavy, and it is apt to drop down into the recto-vesical or recto-uterine pouch. More than once, in females, I have seen such a hard nodulated tumour mistaken for a diseased and prolapsed ovary by gynæcologists, who are not likely to miss such a tumour from want of vaginal examination. In the male, the tumour may be felt in the recto-vesical pouch, and more readily when the examination is made with the patient standing upright. As in cases of intussusception, so in cases of malignant stricture, blood may be present in the stools.

The sudden blocking of a stricture by hard fæces or a foreign body will cause urgent and acute symptoms. It seems to me as if the symptoms and signs of intestinal obstruction — pain, disorderly peristalsis, vomiting, vascular and secretory disturbances, etc., in the intestines above the block, are the result of nerve irritation started by the stimulus of sudden arrest of flatus.

A fallacious belief in the possibility of acute obstruction arising from impaction of fæces requires exposure. Fæcal masses large enough to cause symptoms are exceedingly rare, except in feeble old persons, hysterical women, and lunatics, and they never cause symptoms of acute obstruction; consequently, whatever else may be the cause of an existing obstruction, it is not likely to be impacted fæces.

PROGNOSIS.—The prognosis of cases of intestinal obstruction is very serious, much more serious than text-books or current literature suggest. Of acute cases the great majority die during the first week, and seldom live for more than three days after fæcal vomiting has commenced. It is possible, as every experienced practitioner knows, for these cases to recover when apparently in the most desperate condition; and these rare cases of recovery are impressed upon the memory when the ordinary fatal result is apt to be forgotten. Early death is usually caused by toxic poisoning from absorption of the foul intestinal contents; later, the fatal result is generally attributable to peritonitis, the result of perforation. The course of more chronic cases is steadily towards a fatal termination, which commonly is brought about by the development of an acute attack.

Of general conditions as aids in forming a prognosis, the appearance of the patient and the condition of the pulse are the safest guides. In the most serious state the patient has a pinched, poisoned appearance, and is filled with anxiety to know what is the cause of the attack, and what is to be its outcome. The pulse steadily increases in rate with the advancing absorption of intestinal toxins.

Of the local conditions I attach the greatest importance to abdominal distension. A patient with profuse and frequent vomiting, with severe attacks of intermittent pain, and without marked distension, has a fair chance of recovery; for the intestines in such a case are still active and able to empty themselves; but one who does not vomit, who has no serious pain, and whose distension is increasing, is quite unlikely to get over the illness. Above everything else, the prognosis depends upon early diagnosis and upon proper treatment. To emphasise the importance I attach to this statement, and to illustrate my meaning, the following extract from a recent address of mine may be useful:[1]—

Intestinal obstruction cases.—"The pain at first may not be bad enough to raise alarm, and its paroxysmal character and accompanying wind-rumblings may be placed to the credit of dyspepsia, or colic, or constipation, or some other more trifling trouble. During their stay in my wards several patients have developed symptoms of acute obstruction due to bands and adhesions, and I will mention in detail the treatment which we have adopted for them. If the pain has been severe and paroxysmal, and has been attended by vomiting and wind-rumblings and visible or palpable peristaltic movements of the intestines, making the diagnosis definite, immediate operation has been the rule. If the diagnosis has been less certain, $\frac{1}{4}$ gr. morphia injected hypodermically has been ordered. If the symptoms are removed by this, and do not reappear after eight hours, the condition is probably due to nothing serious; but whether or not, a dose of castor-oil and an enema are given to clear up the remaining difficulty. If the case is one of intestinal obstruction, acute symptoms of obstruction are produced, and operation is undertaken at once. The results of this treatment will carry greater weight than anything I can say."

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[1] *Lancet*, London, January 31, 1903, p. 10.

In the absence of both of our surgical registrars, I am indebted to Mr. J. W. Heslop for examining the Hospital records from 1900 up to date. He has found a note of eleven patients who were attacked by acute intestinal obstruction whilst under my care, and suffering from other conditions. Of these, nine recovered and two died. One death occurred in a patient who was not operated upon, from mistaken diagnosis. Of ten patients operated upon, nine recovered and one died. The patient who died was a young man whose appendix had been removed two days previously, and who developed a complicated volvulus, involving the small intestine.

It cannot be held of these cases that they were easy from the surgical point of view. Every one required more serious manipulation than the reduction of a recent intussusception, or the release of bowel strangulated by a band, or the reduction of a kinked or twisted loop of intestine necessitates. To prove this, I need only read notes of the last case of the sort that I operated upon, to be quite fair, prefacing it by the statement that the patient was an unusually robust young woman.

Case 1.—The patient, a female, æt. 35, was operated upon first on 10th June 1902. She was then very ill, with an acute abdominal illness diagnosed as abscess in the pelvis and in connection with the vermiform appendix. Her abdomen was opened over the right iliac fossa, by an incision extending from the loin behind. Some clear fluid escaped on opening the peritoneum. The colon and the cæcum were adherent to the parietal peritoneum on the outer side, and on gently separating them fœtid pus escaped. The appendix was found lying on the outer side of the cæcum and colon with its tip pointing upwards to the hepatic pouch, and was excised. The pelvic brim was filled with matted adherent intestine. The abdominal wound was covered up, and the patient was placed in the lithotomy posture, the pelvic abscess, from which a large amount—about one pint—of fœtid pus was evacuated, being opened and drained through an incision in each lateral vaginal fornix by drainage tubes sewed in. The vermiform appendix contained a stercolith, and was perforated at its centre. There was a free discharge of pus, especially from the vagina, for some days, but the patient made a good recovery, and was about to leave, when, on the night of 14th July, one month after the operation described, she was suddenly seized with symptoms of acute obstruction, and became very ill. The second operation was performed a few hours later. The abdomen was opened in the middle line. The small intestines were congested and beginning to distend, the distended loop leading to the pelvis where the obstruction was located. It was due to adhesions, many of which were easily separated, but those in the depths of the pelvis became more dense. In separating a loop there, a small abscess was opened and pus escaped. The traction on the inflamed and adherent loop resulted in tearing the intestine almost completely across. Six inches of torn and damaged intestine were excised, and an end-to-end approximation was made by catgut sutures. The abscess in the pelvis was thoroughly mopped, and the whole pelvis was washed out with saline solution. The abdomen was entirely closed. The patient recovered, and is now in first-rate health, with firm scars.

These results have not depended on any special operative skill of mine, for some have come under the care of my assistants, and their cases have done as well as my own. As additional proof of this, I may state that my results from operations for acute intestinal obstruction involving the small intestine, performed on the third or fourth day when the small intestines are distended, have been so bad that I could count the recoveries on my fingers. There is only one explanation of these surprising results, and I want to drive the lesson this experience has given me as strongly home as I can, and it is that if patients with acute intestinal obstruction are to have the best chance, they must submit to operation without delay. As further bearing on this point, I may mention the results obtained at the infirmary in intussusception. From the commencement of 1900, twelve cases of acute intussusception have been admitted to the surgical wards of the Royal Infirmary for operation. In four of the cases the gut was found to be gangrenous, and all of the patients died. Of the eight cases in which the gut was not gangrenous, six patients recovered and two died. One of the deaths was caused by a second intussusception, which was not discovered till the post mortem examination. The second death occurred in an acute case of twenty-four hours' duration in a child five months old.

TREATMENT.—The treatment of intestinal obstruction has not advanced in proportion to other progress made in abdominal surgery; indeed, I think it safe to say that in regard to cases in which the obstruction is limited to the small intestine, excluding those of the large intestine, the general results are no better now than they were twenty-five years ago.

Why is this? The explanation I have to offer is made clear in the previous quotation. It is that operations are not done early enough. To be successful they must be performed before the patient's heart is weakened by toxic absorption, and before the intestines have become paralytic; and neither of these conditions take long to develop. As soon as physicians and practitioners realise that intestinal obstruction arises only from mechanical obstacles, and that the sole rational treatment of it is to remove its cause at the earliest possible opportunity, then, but not till then, will the prognosis of intestinal obstruction improve. The improvement may then perhaps be as striking as that which has occurred in the results of strangulated hernia, since it became generally recognised that early operation was its only satisfactory treatment. My reported cases show only too well how little is to be expected from late operations.

The lines on which I think treatment should be conducted will bear some repetition.

Relief is demanded for the pain, and opium in one or other of its forms is the only drug to be relied upon. If administered by the mouth, it may either be vomited or fail to be absorbed, so that it should be given by the rectum, or preferably hypodermically. The first dose should be sufficient ($\frac{1}{4}$ gr. of morphia for an adult by hypodermic injection; 50 minims of tincture of opium in warm water as a rectal injection), for repeated small doses of opium are to be condemned in all acute abdominal cases. Administered in frequent small doses the drug masks all symptoms, and so leads to a false sense of security; it paralyses the intestines, and thereby favours toxic absorption; and it produces a hyperæsthetic condition of the patient, very unfavourable to recovery from an operation. Further, a reduction of the accustomed dose leads to physical and mental collapse, and patients who have been under its influence for a few days are predisposed to die from shock after an operation. Though no one who has seen it can doubt the marvellous temporary improvement in the general condition of the patient, brought about by the skilful use of opium, yet I doubt the existence of the real curative influence ascribed to it by generations of authorities.

Before the administration, careful examination, which should never be omitted, may have made it obvious that the patient was dangerously and acutely ill; in all such cases no time should be lost in waiting to see what the effect of the opiate may be. Operation should be undertaken without further delay. Other cases, less definitely ill, should be seen at short intervals, and closely watched as the effect of the opiate passes off. If the symptoms return, then an operation should be done; if not, after eight hours' rest a dose of castor-oil followed by an enema will make it clear whether there is obstruction or not.

If the case is not seen until the abdomen has become distended, and if the symptoms have all been rendered less aggressive by repeated doses of opium, the question of operation has lost much of its urgency; indeed, immediate operation may not offer the best chance of recovery (see Case 21). If a little flatus has been passed, if occasional peristaltic movements are observable in the intestines, if the stomach contents are expelled with vigour, if the distension is not increasing or causing tension, and if the pulse is retaining its vigour and is not rapid, the case is a favourable one for palliative treatment.

The three most material aids to recovery then are—

Stomach lavage, abstinence from mouth feeding (nutriment to be given by enemata), and repeated small doses of opium. The tolerance of patients for stomach washing varies. Some experience so much relief that they ask for a repetition of it, others clearly suffer so much inconvenience during its performance that the possible benefit is more than counterbalanced by its risks and disagreeableness. Occasional large hot drinks to encourage vomiting (weak tea or water are generally liked) may then be used as substitutes. No food by the mouth should be allowed so long as sickness is a troublesome symptom. Food and nutritive fluids introduced into the stomach only add to the sufferings of the patient, and often diminish an already small chance of recovery. After cleansing the stomach, to relieve the intense thirst, sips of hot water may be frequently given, and the mouth may be sluiced with cold water as often as desired by the patient, but none of this should be swallowed. Ice gives only temporary relief, and does permanent harm. It makes the mouth sore and the tongue dry; it fills the stomach with cold water, thus depressing the vitality; and it increases flatulent distension. All nutriment should be administered by the colon. The best method of doing this is to give slowly through a rectal tube and raised funnel one pint every two or three hours of the following mixture:—fatty beef-tea and milk in equal parts, with one teaspoonful of salt and half an ounce of whisky, at a temperature of 100° F. The first two or three pints are frequently retained when given in this way, whereas the intermittent pumping action of the ordinary enema-syringe, commonly used for this purpose, stimulates the bowel to expel the injected fluid. When the enemata begin to come away, it is, of course, a favourable omen if some flatus is passed at the same time. Diminution of the abdominal distension, as shown by careful measurement round the umbilicus, is also a favourable sign. If the enemata are retained for twenty-four hours, it is necessary, as in all cases where food is given by the bowel, to administer a quart of salt water to clear out the offensive débris. From the use of nutrient suppositories little good need be expected, and if the enemata cannot be retained their expulsion is a strong indication for early operation. In connection with enemata, it may be mentioned that their use in the treatment of intussusception is strongly recommended by nearly all authorities. It is agreed that they have no value in the most acute cases, or in cases involving the small intestine. It is also agreed that there is a certain amount of danger in their use.

Before giving the enema, if this is decided upon, an anæsthetic must be administered to assure complete muscular relaxation. Hot salt water, a drachm to a pint, is the least irritating injection, and as much of it should be introduced as can be retained. The enema funnel should not be raised more than three feet in the case of children, who may be held up by the feet during the administration. It is usually impossible to say when this means is successful; even if a tumour previously distinctly felt is found to have disappeared, it is not certain that its reduction has been accomplished, and valuable time may be lost in waiting to see if the symptoms return. It is usually safe to prophesy that they will do so, and, except in the more chronic cases, in which a short period may be allowed to be wasted with comparative impunity, operation ought to be done as early as diagnosis permits.

Repeated small doses of morphia in the favourable cases previously mentioned are often of great service—a 10-minim dose of liq. morphia hydrochlor., in 1 drm. of peppermint water, given by the mouth, when the patient is restless or in pain, secures bodily and mental rest, and has a steadying effect on both mind and body.

If nothing short of narcotism brings relief, operation is urgently indicated.

In addition to the use of stomach lavage, nutrient and stimulating enemata, and morphia, which are the most important means of relief, there are smaller details requiring attention. A hot, moist poultice, large enough to cover the whole abdomen, kept on for an hour, and repeated at intervals of eight hours and replaced by warm cotton-wool, is useful. A hospital bed and a good nurse are great comforts, and are important aids to recovery.

OPERATION IN ACUTE INTESTINAL OBSTRUCTION.—During the first twenty-four to forty-eight hours it is possible as a rule to perform a radical operation which allows the cause of the obstruction to be dealt with, and which offers a good prospect of complete success (see Case 3). The rule for these cases should be, that as soon as the diagnosis is made an operation must follow.

Preparation of the patient for operation.—Morphia will already have been given to relieve the pain, and the skin of the abdomen is prepared in the usual way. The arms and legs and chest of the patient are to be swathed and bandaged in warmed cotton-wool, and the room in which the operation is to take place should be heated up to 70° F. It is also of the greatest importance, more especially in the case of children, to maintain the body heat by warm clothing, hot bottles, and towels wrung out of hot lotion, for the avoidance of chilling is by far the most effective means we possess for preventing shock.

Special instruments (intestinal clamps and buttons and Paul's tubes), as well as ordinary ones, should be ready for use, and everything should be prepared to carry out the operation with as great expedition as possible after the administration of the anæsthetic.

If the stomach is distended, it should be washed out, to prevent its septic contents from being drawn into the lungs of the anæsthetised patient.

Chloroform, in the hands of a skilled administrator, is the best anæsthetic for general use; and the previous dose of morphia aids its action, making only a small quantity necessary. Before commencing the operation, abdominal palpation should be repeated, for a tumour which has previously escaped observation may now be discovered, and to be able to make the incision directly over the site of obstruction adds materially to the chances of success.

When no clue as to the neighbourhood of the obstruction is available, the incision is commenced 1 in. above the umbilicus, includes this in an ellipse, and is prolonged to 2 in. below it. The umbilicus is then excised, and in doing this the abdominal cavity is opened, the opening being enlarged upwards and downwards with scissors on a protecting and guiding finger introduced through the umbilical ring.

The first object of the operation—to confirm the diagnosis—will now be realised; for, from the earliest stage, obstructed intestine is distended and increased in vascularity. The absence of inflammatory peritoneal exudates excludes the possibility of acute peritonitis, which, in some rare cases, produces symptoms and signs so closely resembling those of pure mechanical obstruction as to be indistinguishable until the peritoneum is opened. Search is now commenced in the neighbourhood of the wound, which may be opened up by retractors, the greatest care being taken to prevent the escape of intestines from the abdominal cavity by the use of warm flat sponges or sterilised swabs. Experience has taught me that much disturbance of the relations and position of the small intestines, and their exposure, is almost inevitably attended by a fatal result in these cases. One occasionally reads of successful cases, in which the intestines were taken out, enveloped in hot towels or douched with saline, opened, emptied, sewed up, and returned; the only explanation that can be given of these remarkable successes is, that some patients appear to have a capacity for recovery which has been of exceptional assistance to the operator.

The second object of the operation—to ascertain whether the obstruction is in the small or in the large intestine—will be attained by noting the position and appearance of the distended and vascular loops, which are always situated above the obstruction; those below are contracted and pale. The large intestine, besides its position and relation to the omentum, is easily recognisable by the longitudinal bands of its muscular coat.

The third object of the operation—supposing the obstruction to be in the small intestine—will be to find it with as little handling of the distended and friable gut as possible. The cause and site of obstruction will be best ascertained by drawing forward the first pale and contracted loop, by fixing this and following it up or down inch by inch, putting each loop back as it is withdrawn, until the block is discovered. If the obstruction cannot be found readily through a small incision, the original one should be extended downwards towards the pubis, an assistant always retaining the intestine with hot flat sponges. Here, as elsewhere in surgery, to see what is being done is of first-rate importance;

and a long incision which allows of this is less dangerous than one so short as to make it necessary to grope in the dark. With the long incision it is easiest and quickest to examine the cæcum first. If that is distended and reddened, the obstruction is in the large intestine; if it is empty and pale, the obstruction is in the small intestine.

The end of the ileum as it enters the colon serves as a guide to the small intestine, which should be followed steadily upwards to the seat of obstruction.

When the cæcum indicates obstruction in the large intestine, the next step is to draw the sigmoid flexure out of the pelvis. If it is pale and empty, the obstruction is above. By drawing down the omentum and elevating it, the transverse colon is exposed, lying on its under surface. If it is empty and pale, the obstruction must be found in the ascending colon, or in the hepatic flexure.

The cause of the obstruction has now been found; and this should not occupy any long time, if the schematic method suggested is carried out with prompt precision. Time, so important in these operations, is too frequently lost by a want of well-considered method in their performance; the plan now suggested, one which has been developed for my own guidance, has stood the test of experience; I therefore hope it may prove of some use to others.

In the early cases, and those alone have entered into consideration as yet, a radical and complete operation for the removal of the cause can be performed with good prospects of success (see Case 3).

Unfortunately surgeons seldom have as yet the chance of treating these cases early enough, and the chief object of my paper is to impress the fact that the present great mortality from intestinal obstruction is the result of delay in operating. The illustrative cases convey this important lesson more emphatically than any words of mine could.

Patients with acute intestinal obstruction are even worse than they look; and if the small intestines are considerably distended, they seldom get well after a complete or prolonged operation, however satisfactory, from the operative surgical point of view.

The operation of choice for such patients is enterostomy. It has been my misfortune to perform this operation, and to find, on subsequent post mortem examination, that the intestinal opening was 12 in. below an impacted gallstone lying immediately under the anterior abdominal wall, the intestine being red and disturbed from commencing peritonitis; to discover, after an immediately successful enterostomy, that death on the ninth day was due to gangrene of a loop of bowel ensnared by a string-like adhesion easily accessible; and to see curdled milk oozing through the fistulous opening soon after it had been swallowed, showing that the incision had been made so high in the jejunum that death from starvation must shortly be expected. Against these disappointing results, which a more thorough surgical procedure could have averted only by the certain sacrifice of the patient's life, must be placed the cases in which enterostomy has afforded another chance of life, which the more complete operation did not. A second operation is generally required after enterostomy, but it is not an unique experience (see Case 22) to find the symptoms permanently relieved, and to see the patient completely cured, with spontaneous healing of the fæcal fistula.

Enterostomy may generally be regarded as a protest against delay; but until early operation becomes more frequent, it holds a useful place in the treatment of intestinal obstruction (see Cases 4, 5, 12, 13, 18).

The operation.—A short oblique incision in the right iliac fossa, which can be made in bed and under local anæsthesia, opens the abdomen and exposes the cæcum. If this is not distended, the nearest loop of distended small intestine is drawn forwards out of the abdomen, packed round with gauze, and opened away from the wound. Into the opening a Paul's tube is firmly tied with silk, and the ligatured bowel is wrapped in iodoform gauze. A gauze and wool dressing, freely sprinkled with powdered boracic acid, is applied round the tube, and a firm many-tailed bandage, keeping the dressing in position and preventing the bowel from prolapsing, completes the operation.

STRICTURE OF THE LARGE INTESTINE.—These cases form a large percentage of the cases of intestinal obstruction, and are consequently of great importance; and the same rules are not applicable to them as hold good for obstructions in the small intestine. The first fact, of such great surgical importance that it deserves special recognition, is that distension, limited to the large intestine, is no barrier to satisfactory exploration, if the general condition of the patient is sufficiently good. Collapse and disaster do not frequently follow manipulation of the distended colon, as we have seen to be the case when the small intestine is in question. Consequently, if the patient is vigorous enough, the operation is undertaken with two objects in view—(1) The remote one of a radical cure, and (2) the immediate one of giving relief. The first demonstrates, for future guidance, the exact situation of the disease; its character; whether a growth is fixed or movable; and the presence or otherwise of enlarged glands or secondary deposits in the peritoneum, liver, or elsewhere.

To attempt to remove a growth in the colon in the presence of obstruction is to court disaster; for the added chance of sepsis from the passage of foul intestinal contents, the fact that wounds in the colon do not unite so readily as those in the small intestine, and later, the passage of solid fæces, all combine against success.

In inoperable conditions, left inguinal colotomy is the operation of selection *if the obstruction is too low down to admit of anything else.* It is preferable to a permanent opening elsewhere in the colon, because further from the fluid contents of the cæcum and the small intestine, so that the irritation and inconvenience and disgust of constant escape of fluid fæces are thus averted. If the original exploratory opening has been made in the middle line, a second incision, 1½ in. in length, should be made in the left iliac fossa; and 3 in. of the highest available portion of the sigmoid flexure should be passed through it, and fixed by clip forceps pushed through its mesentery. The bowel, after the incision in the mid-line has been sutured and protected, should be at once opened and drained by a Paul's tube tied in. If a long indiarubber tube is fixed on to the glass one, the contents of the bowel can be discharged into a receptacle under the bed, and the wound and the dressing may be left untouched till the portion of bowel made gangrenous by the ligature tied round the tube, sloughs and allows of fæcal leak. This occurs from the fourth to the eighth day. The operation is completed by transverse division of the exposed bowel on the tenth day. This small operation is often followed by hæmorrhage, sometimes so profuse as to be dangerous, and always difficult to arrest (see Case 6); I have therefore adopted the simple plan of securing the division by an elastic ligature. This is drawn through the hole in the mesentery by the forceps left in it, and tightly tied over the bowel, below or over the sloughing hole left by separation of the tube to allow of the escape of gas (see Case 8, etc.).

I have previously expressed my belief as to the indications for permanent inguinal colotomy; briefly, it is that it should be undertaken to save a life threatened by intestinal obstruction due to incurable cancer. In very rare cases of rectal carcinoma attended by severe hæmorrhage and rectal tenesmus, or complicated by a recto-vesical fistula, there may be found an excuse for it; but there is no excuse for the wholesale application of it suggested by some surgical text-books. A recovery after inguinal colotomy, unless performed as a last resource, is not by any means a surgical triumph; nor is it an operation likely to evoke the grateful recognition of the public for benefits received.

If exploration shows that a removable growth is present, except when the growth is in a freely movable portion of the sigmoid flexure or of the transverse colon, my practice is to open and drain the cæcum for the relief of the obstruction; and I do the same if the patient's general condition does not allow of exploration. The pressure of the intestinal contents is greater in the cæcum than elsewhere, consequently patchy gangrene of it may occur wherever the obstruction in the colon may be; the cæcum is sufficiently movable to be drawn forward with ease, and a cæcostomy opening in the right iliac fossa is well out of the way of subsequent incisions, hence the choice of this part of the colon. The operation is performed through a small oblique incision in the right iliac fossa; through this the cæcum is drawn forward, then opened and drained by a Paul's tube. Two or three hare-lip pins passed through it and resting on thick pads suffice, with the help of a good dressing, to keep the bowel in position. After the patient has recovered, and the bowel has been thoroughly cleansed, the removal of the growth can be undertaken; and the lumen of the bowel may be restored by an anastomosis. Then, at a later stage, the opening in the cæcum should be closed, if it does not do so spontaneously.

Entailing, as this programme does, a prolonged illness and three distinct operations, some doubt may be felt as to its wisdom. I do not doubt at all, being convinced that this is the only method which offers a fair chance of recovery in these serious cases. What does concern me, and this, I think, is a point as yet unsettled, is the question of the manner in which the anastomosis is to be made. The best published results, so far as I know them, are those of Mr. Caird of Edinburgh, Mr. Littlewood of Leeds, and Mr. Bilton Pollard of London. It is significant that they all advocate end to end anastomosis with suture alone, and have obtained their remarkable successes by this method. Nevertheless I am not persuaded. My own best results, though they cannot compare with those mentioned, have been obtained by lateral anastomosis and a large opening and simple suture, after closure of the divided bowel ends. The next best results have been obtained by end to side approximation. Our worst have been by end to end juncture, those obtained by suture and button being equally bad. Up to recent times I have strongly advocated a simple suture; but this year, guided to some extent by American views and statistics, I have, as will be observed, used the button for everything; and I have invented one of decalcified bone,[1] which possesses, I think, most of the advantages of the ingenious and well-known Murphy, and few of its disadvantages.

If the growth is in the slack of the sigmoid flexure or of the transverse colon, it should be drawn well out of the abdomen, and fixed there by forceps through the mesentery, and left till firm adhesion has occurred (ten to fourteen days).

The bowel above is immediately opened and drained. As soon as the patient has recovered (in perhaps two weeks), and the intestine has been cleansed, a second operation is undertaken for the removal of the growth. If care be taken to prepare the skin and the bowel for a few days, resection of the growth, followed by closure of both divided ends, lateral anastomosis, and return of the whole into the abdomen, is a very safe and satisfactory operation. I feel confident that one of my recorded cases (see Case 18) died in consequence of my inability from indecision to make sufficient use of the information in my possession. With the operation I have described, the result would almost certainly have been success instead of failure.

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[1] I am indebted for many of the details of this button to Mr. G. Gray Turner, under whose directions it has been made by M'Queen & Son, surgical instrument makers, Newcastle-on-Tyne.

A further question, for which I have no satisfactory answer, concerns the use of purgatives after suture of the colon. I am disposed to think that in my anxiety to keep the motions fluid, and so to avoid strain on the suture line, I have erred.

In a third class of case the cause of obstruction is found to be inoperable. What should be done? The patient has only a short time to live. Is it worth while subjecting him to the inconvenience, depression, and risk of several operations to make temporary recovery more certain? I am disposed to think not. My view is that the risk of an immediate anastomosis and complete closure of the abdomen should be accepted (see Cases 15, 20). The position of the obstruction and the anatomical conditions will determine where the anastomosis is to be made. A favourite method of mine, when the sigmoid mesentery is long enough to allow of it, is to draw the omentum down, to pull the sigmoid flexure up over it, and join it to the cæcum, the omentum lying underneath the junction and separating it from the small intestines like a pad.

More than once I have seen the ileum, united to the sigmoid flexure in obstruction, situated between the cæcum and sigmoid. The result has been distension, gangrene, and perforation of the cæcum, and death from peritonitis a few weeks after the operation. Though I have drawn attention to this self-evident fact before, self-evident if the usual competency of the ileo-cæcal valve to resist the escape of any of the cæcal contents backwards be remembered, it does not seem, judging by recorded cases, to have met with universal recognition.

If cæcostomy has been performed, transverse division of the ileum and ileo-sigmoidostomy is a good operation, because it saves a third one for the closure of the cæcum (see Cases 13 and 14). Some patients are so fastidious as to object to the trifling prolapse and mucous discharge which, under those circumstances, escapes from the cæcostomy opening. If fluid, introduced into the rectum, passes through the colon and freely out of this opening, it will be safe to close it completely, but not otherwise. In the latter case discomfort may be minimised by suturing the opening up round a small indiarubber tube, which must be worn permanently.

Mistakes in Diagnosis during the year. Several patients suffering from general peritonitis were sent in as cases of intestinal obstruction, in the course of the year. In some of them symptoms of intestinal obstruction were present; and as post mortem examination has proved that distended sticky kinked small intestines are indeed mechanically obstructed, a correct diagnosis may occasionally be impossible. The history is sometimes a useful guide. Intestinal obstruction commences suddenly and without fever. The rupture of the vermiform appendix and leak into the peritoneum occurs suddenly too, but the sudden attack has been preceded by a day or two of considerable abdominal trouble. In the early days of peritonitis there is fever. The chief pain of obstruction occurs in severe paroxysms which are characteristic. Vomiting is more troublesome in obstruction than in peritonitis. Inability to pass flatus or fæces may be present in both. Rigidity of the abdominal muscles and tenderness of the parietes are marked in peritonitis, absent in intestinal obstruction. To see and to feel increased peristaltic movements and to hear increased rumbling are the signs by which cases of intestinal obstruction may be distinguished from other simulating conditions.

The abdomen was uselessly explored once, in the belief that a stricture of the colon might be the cause of serious symptoms. The patient was a middle-aged man, who, after an illness of six weeks' duration, alternating diarrhœa and constipation being the chief symptoms, was seized suddenly with an attack of complete intestinal obstruction which lasted for seven days and was only relieved with difficulty. He had lost two stones in weight since his illness commenced. Careful examination was negative in result, but it was decided to explore his abdomen. No evidence of anything wrong with his intestinal track was found. He recovered.

One case of acute pancreatitis, as so often happens, was sent in as an intestinal obstruction. A definite diagnosis was made in this instance, as will be reported in a later paper, by palpation of the enlarged and tender pancreas.

Kidney disease may cause attacks of abdominal pain and other symptoms so closely simulating intestinal obstruction as to lead to error in diagnosis. The following is a good example[1]:—

Case 2.—T. C., male, æt. 59, was admitted under the care of Mr. Morison on the 6th January 1902.

The following is an abstract from the clinical notes:—Six months ago the patient began to suffer from paroxysmal attacks of abdominal pain with chronic constipation, borborygmi, and difficulty in passing flatus. With these attacks vomiting occurred at intervals. For three or four months he had got rapidly thinner, and had become very weak and very drowsy. He had sometimes passed blood per anum during stool. He was sent in as a case of malignant stricture of the sigmoid flexure, causing chronic intestinal obstruction.

On admission he was in poor general condition, had a grey, pinched look, furred tongue, and complained of thirst and nausea. The pupils were contracted. Temperature normal. Pulse 120, and radial artery atheromatous. Urine, sp. gr. 1010; no albumin. Nothing definite was made out on examination of the abdomen or the rectum. After careful observation for some days in hospital, a diagnosis of granular kidneys with pseudo-obstruction of the bowels was made. No operation was consequently advised, and the patient was sent home on the 16th of January 1902.

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[1] See *Northumberland and Durham Medical Journal*, January 1903, p. 50.

January 24, 1902.—The patient died at home. We are indebted to Dr. Smith of Ryton for a report of the necropsy. He found marked granular kidneys, with hypertrophied heart. There was no intestinal obstruction, and no other lesion to account for the illness.

(*To be continued.*)

OBSTRUCTION OF THE INFERIOR VENA CAVA.

By J. Dixon Mann, M.D., F.R.C.P., *Physician to the Salford Royal Hospital,* and I. Walker Hall, M.D., Ch.B., *Assistant Lecturer on Pathology in the Victoria University of Manchester, Honorary Pathologist to the Salford Royal Hospital.*

(Plate I.)

Although not of exceptionally rare occurrence, obstruction of the inferior vena cava is rarely described in the ordinary text-books on medicine. The symptoms of the disease may be either so characteristic as to proclaim the diagnosis; or, by apparently pointing in another direction, they may render it obscure. The following case belongs to the first-named class:—

Case 1.—The patient, F. H., æt. 27, was admitted into the Salford Royal Hospital, 5th October 1903. For the following clinical notes we are indebted to Dr. C. A. Ricketts, house physician.

Family history.—The only information that could be obtained was that the patient's mother suffered from "bad legs," and that her sister had dropsy and varicose veins at each of her four confinements.

Personal history.—The patient has been delicate all her life, and was treated for anæmia five years before admission. She has been married twelve months, and was confined 27th June 1903. Her medical attendants, Drs. Bruce Bell and Macnair, who sent the case into hospital as one of obstruction of the inferior vena cava, kindly furnished us with the information that delivery was followed by very profuse hæmorrhage, from which the patient soon recovered, and appeared to be doing well until 27th July, when she had pain in the abdomen and back, and in the right thigh, which was swollen. The abdominal pain was high up, chiefly in the epigastrium. The temperature was intermittent; no distinct rigor was observed. A fortnight after, the abdomen became swollen, and during the ensuing ten weeks the patient was tapped three times at intervals of two and three weeks.

On admission, the patient was emaciated and feeble. Round the abdomen she measured 38½ in. The superficial abdominal veins were very much distended; the coats of some of the larger of the veins had permitted a slight percolation of blood into the tissues immediately alongside, which gave a blurred appearance to the outline of the vessels. The patient complained of pain in the epigastrium, to the right side. The temperature was never above the normal after she came into hospital; it oscillated between normal and 97 ° F. On the second day after admission the patient was tapped, and 340 oz. of a clear, pale yellow liquid was gradually withdrawn, after which the liver could be felt to be considerably enlarged. There was no œdema of the legs. The bowels acted freely, but only occasionally was there diarrhœa. In the early stage vomiting occurred, but not subsequently. The urine was scanty, amounting only to from 12 to 24 oz. daily. On 12th October the patient complained of acute pain in the right side of the chest, where a pleuritic rub was audible; dulness subsequently developed, and, with the aspirator, 1½ oz. of thick sanious liquid was withdrawn, which showed a tendency to clot on standing. On 19th October the girth of the abdomen was 35 in. Much pain was experienced in the side of the chest and in the abdomen, which was only partially relieved by morphine. About this time the patient passed much more urine, from 40 to 50 oz. daily. On 28th October she was again tapped, and 160 oz. of clear liquid were withdrawn. On 9th November the abdomen measured 36½ in. The legs have been free from œdema since admission. The appearance of the superficial abdominal veins remained unchanged. The patient now developed delusions, and became restless and talkative. After a day or two the condition changed to one of absolute passivity; she lay in a crouching posture without moving and without speaking. She took no notice of anything, and made no sign if, for example, she was asked to put out her tongue; nor would she notice her relatives who came to visit her. She remained in this state till 10th December, when she suddenly became much worse, and died tranquilly in a few minutes.

Autopsy.—The autopsy was made twenty hours after death. The abdomen was very distended, and all the superficial veins were dilated. The labia were œdematous, but the legs were normal, though thin. The thoracic contents were all displaced upwards. The left ventricle was dilated, and there was partial collapse of the right lung. The abdomen contained gallons of golden yellow fluid, in which floated a few flakes of fibrin. There was extensive chronic peritonitis, and the intestines were firmly adherent to one another and to the abdominal wall. The parietal peritoneum measured 0·5 cm. in thickness. The spleen, which weighed 5 oz., was covered with a dense pearly membrane, and was very firm and congested. The ovaries were similarly affected. The uterus was normal in shape and in involution. There was hydronephrosis of both kidneys, and both ureters were thickened.

The *liver* weighed 74 oz., was adherent to the diaphragm, to the right kidney, to the transverse colon, and to the stomach. By these attachments and by a large number of well-organised adhesions, the matted intestines were suspended above the true pelvis. The liver corresponded to the condition often described as the "round" or "globular porcelain" liver. Chronic perihepatitis was present, and the thickened capsule was in many places adherent to the diaphragm. The ligamentum teres, gall bladder, and cystic duct were compressed by and enclosed in a thick pearly covering. The structures in the transverse fissure were all patent and normal in arrangement, size, and position.

On section of the liver, numerous anæmic, irregular areas, surrounded by dense red patches, were visible. This mottling was of uniform distribution, although the red, congested areas were most pronounced at the upper part of the right lobe, while at its centre the anæmic patches were both large and numerous. The latter sometimes surrounded hepatic, sometimes portal veins, the former being similarly arranged (*vide* Plate I. Fig. 1). Histological examination showed that the capsule consisted of thick fibrous tissue, from which fibrous strands passed into and between the superficial lobules. The anæmic parts were composed of atrophic liver cells, necrotic débris, and empty capillaries. There was only a very minute quantity of fat, and this was chiefly at the margins and within fat corpuscles. The red areas presented the appearance of passive hyperæmia, hæmorrhagic extravasation, and red atrophy. Much crystallised pigment was present, and around some of the pigmentary collections were foci of small-celled infiltration. Thrombi were observed in many of the hepatic veins, some containing much fibrin, the others being more or less organised. Endophlebitic changes were visible in these, as well as in those vessels whose lumina were patent. Neither micro-organisms nor lardacein could be demonstrated. The bile-ducts were normal. There were no signs of regeneration of the liver cells.

The left *iliac vein* was of normal size, the right was narrow, and its walls were thicker than usual.

The *inferior vena cava* pursued an irregular course, and its adventitial tissue was increased. At the level of the right suprarenal body, the vessel was compressed between the adhesions of the liver and the diaphragm, and for about half an inch its otherwise patent lumen was partially occluded by a central band of tissue, from which several bands radiated and passed to the intima (Plate I. Fig. 2). Microscopically, the obstruction consisted of fibrous tissue containing newly-formed blood capillaries. The radiating bands had a similar structure, and passed into and became continuous with the subendothelial tissue of the vena cava. In some of the interstices were red blood corpuscles, and it was evident that a fair amount of blood was able to pass through the cribriform obstruction. The central portion and the lateral bands were covered by a single layer of endothelium. Adjacent venules showed endophlebitis. Before piercing the diaphragm, the cava followed a tortuous course along the posterior surface of the liver for about six inches. When opened, its endothelial surface was pearly white, and the openings of the hepatic veins were represented only by small depressions. The latter on section proved to be the obliterated orifices of the hepatic veins. Microscopically, they contained thrombi in various stages of organisation, their walls were very fibrous, and the adjacent parenchyma was congested, slightly cirrhotic and pigmented.

The *œsophageal* and *gastric veins* were very dilated.

The fluid removed from the abdominal cavity was alkaline, sp. gr. 1014, of yellow colour, and contained a few cells and a little fibrin. No bacteria could be stained. Chemical analysis gave the following results :—

Water . .	97·09 per cent.	Fat . .	Absent.
Solids . .	2·90 ,,	Nuclein derivatives	Marked traces.
Ash . . .	0·95 ,,	Urea . .	Traces.
Proteids . .	1·88 ,,	Allantoin .	Absent.
Albumin . .	0·92 ,,	Phosphates (P_2O_5)	0·04 per cent.
Globulin substances	0·96 ,,	Chlorides .	0·88 ,,

It would appear that the proliferative peritonitis supervened on some pelvic suppuration, and played a certain rôle in the production of the caval obstruction by compressing the vessel and initiating hyperplastic changes. The lesion in the hepatic veins might be secondary to a thrombus in the inferior vena cava, and the necrotic and congested areas accordingly result from an extending thrombosis and obstruction of the lobular branches. As these lesions advanced, the collateral and compensatory circulation would become unequal to the removal of the circulating fluids, whose amount and abnormal products would be gradually increased by the extending bilateral hydronephrosis, itself the result of cicatricial changes. But the condition may be equally ascribed to a periphlebitis, extending upwards along the inferior vena cava, and promoting thrombosis at the point of compression by concurrent endophlebitis. Such a course would explain the appearance of the obstructing fibrous tissue more clearly than its assignment to a thrombus caught and organised, since the tunnelling in the latter case is generally more central than peripheral. The obliteration of the hepatic veins is also more fully accounted for by an extending phlebitis, for neither the hepatic nor the portal veins are alone involved; the large ingoing branches of the portal vein are thickened, although their lumina are not materially altered, and they are also closely associated with the proliferative capsular changes whose extension would readily occasion pylephlebitis. The appearances described would be consistent, therefore, with a primary peritonitis, leading to a secondary periphlebitis and endophlebitis of the inferior vena cava and the larger portal veins. The inflammatory lesion resulted in thrombosis of the vena cava at the point of obstruction, and also of the caval orifices of the hepatic veins, leading in the former case to partial, and in the latter to total obstruction. An explanation of the liver lesions might reasonably be sought in the action of micro-organisms, but although every possible method was employed, none could be demonstrated. This would preclude their presence at all events in the later stages, and the distribution and appearances of the lesions do not suggest such an origin, although it must be remembered that the primary peritonitis would be of bacterial origin, and the infection might easily spread to the hepatic tissues.

The conditions which may give rise to obstruction of the inferior vena cava comprise syphilitic, gonorrhœal, and septic infections, malignant disease of the kidneys and other abdominal organs, anæmia, chronic inflammatory affections of the peritoneum, and pressure on the vein produced by enlarged glands, sarcoma, cancer of the stomach, pancreas, and duodenum, or, in one case, by a gallstone. Compression of the hepatic vessels caused by cancer, cirrhosis, and syphilis of the liver has also caused obstruction of the inferior vena cava. The causal conditions may be classified as intravascular—primary thrombosis, and atheroma with sequential thrombosis; and extravascular, the result of compression of the vein by some mechanical agency, such as a neoplasm. Probably both causations participated in the case under discussion. In addition to the causal agencies above named, a not inconsiderable number of cases are recorded as being due to causes unknown.

It is obvious that the initial symptoms of obstruction of the inferior vena cava are largely determined by the manner in which the obstruction is produced. When it arises from an infective or other agency by which primary thrombosis is rapidly developed, the symptoms are not only extremely acute and violent, but they are such as may suggest the occurrence of a totally different pathological condition. The sudden onset of abdominal pain, followed by vomiting, possibly with hæmatemesis and collapse, are suggestive of a phase of gastric ulcer; yet such a train of symptoms is frequently met with in acute obstruction of the inferior vena cava. Sidney Phillips (1) records the case of a girl, æt. 19, who was suddenly attacked with symptoms closely resembling those due to perforation of a gastric ulcer. After the state of collapse was recovered from, the abdominal pain subsided for eighteen days, when it returned, and shortly after the patient died. On examination, the entire length of the inferior vena cava was found to be occluded by a thrombus, without any other indication of abdominal disease, nor could any etiological clue be obtained, save that the patient had suffered from a moderate degree of anæmia.

In acute cases, rigors and elevation of temperature occur, both chiefly due to the causal infective processes. Hoche (2) reports the case of a woman in whom the placenta was retained after miscarriage; she had frequent rigors and a temperature of 104° F., followed by symptoms of acute obstruction of the inferior vena cava, which after death was found to be thrombosed from the utero-ovarian veins as far as the right auricle. In the early stage the patient had severe lumbar pain, which Hoche regards as due to the commencement of the thrombosis of the cava. In a case reported by Fothergill (3), of thrombosis of the inferior vena cava due to septic retained placenta, the temperature on one occasion rose to 111°·2 F.

Rapid blocking of the vena cava, apart from sepsis, is also usually accompanied by elevation of temperature. Weinberger (4) relates an interesting case in which, in consequence of profound chlorosis, acute thrombosis of the inferior vena cava occurred in a girl, æt. 21. The blood showed only 12 per cent. of hæmoglobin, and contained only 1,600,000 red corpuscles with 12,800 white corpuscles to the cubic millimetre; the blood platelets were also reduced in number. The temperature rose to 104° F.; cyanosis, vomiting, profuse watery diarrhœa, pain in the abdomen,

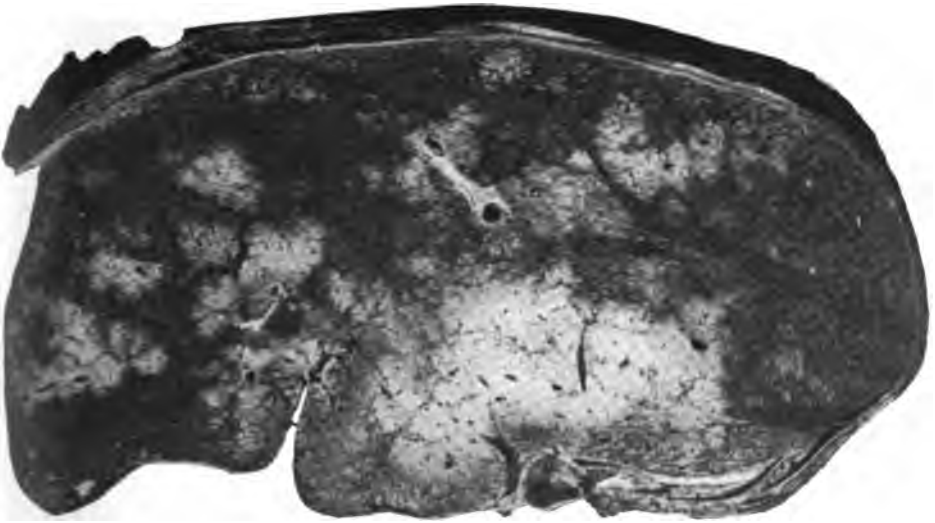

FIG. 1.—Transverse longitudinal section of the liver. Externally, the diaphragm is seen to be adherent to the thickened capsule. The anæmic areas stand out clearly. The section passed through the inferior vena cava near the point of obstruction, and the vessel, with its partially occluded lumen, is seen on the lower border.

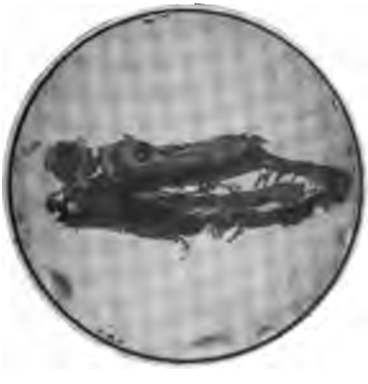

FIG. 2.—Section of the inferior vena cava at the point of obstruction. To show the central band and radiating strands of fibrous tissue.

and œdema of the lower half of the body as far as the umbilicus, with pronounced enlargement of the superficial veins up to the breasts, occurred. Treatment by rest, iron, and arsenic rapidly improved the condition of the blood, which was followed by gradual disappearance of the obstruction in the vena cava, with subsidence of the symptoms it had produced, the patient making a complete recovery. Huels (5) records a case of acute cava thrombosis due to anæmia, in which recovery also took place; the temperature slightly exceeded 103° F.

Diarrhœa nearly always occurs at one or other stage of the obstruction of the vena cava, the motions often being watery; in a limited number of cases they contain blood.

When the obstruction is due to gradually increasing pressure, or other factor by which the lumen of the vein is slowly diminished, the symptoms are less violent, and they follow a different course. The most prominent symptoms of chronic obstruction are enlargement of the superficial abdominal veins (which occurs in about half the number of cases) and ascites; both of these symptoms are met with in cases of acute obstruction which survive for a considerable time. Chvostek (6) states that dilatation of the superficial abdominal veins only occurs after long continuance of the obstruction of the inferior vena cava. Cavasse (7) examined the body of a man, æt. 54, in which the inferior vena cava terminated in a cord-like prolongation, probably of congenital origin, and yet the enlargement of the superficial abdominal veins only appeared two years before death, which was due to pneumonia. In many cases, however, the abdominal veins become varicose at a comparatively early period after the lower cava is obstructed; in our case the dilatation was well marked about two months after. Several writers—Eichhorst, Borrmann (8), and others—have directed attention to the extremely rapid recurrence of the ascites after paracentesis, as a differential diagnostic sign between obstruction of the inferior vena cava and hepatic cirrhosis. In the case under discussion, the reaccumulation took place with no greater rapidity than is frequently seen in advanced cirrhosis. In about one case out of ten, ascites does not occur. In about one out of eight or ten cases of prolonged obstruction of the inferior cava, the spleen is enlarged; in our case the spleen was not enlarged. In eleven cases of primary atheroma of the inferior cava, Borrmann found that the liver was small; but these cases were probably of syphilitic origin. In many of the recorded cases, including the present one, the liver was considerably enlarged. An extremely chronic case, in which the liver projected two inches below the costal margin, is recorded by Saundby (9). The patient was first seen in May 1895, when she had varicose veins over the front of the abdomen and effusion into the left pleura. The patient was again admitted into hospital in March 1897 with dyspnœa cyanosis, œdema of the legs and abdominal wall, and ascites. Again, there was effusion into the left side of the chest. Death took place in April 1897, and the vena cava was found to be occluded from its lower and as far as the entrance of the hepatic veins, the upper part being filled with firm fibrous tissue. The patient was a nulliparous married woman, without any history of gonorrhœa or syphilis.

It is somewhat surprising that, in a not inconsiderable number of cases of obstruction of the inferior vena cava, extending above the level of the renal veins, the function of the kidneys seems to be unimpaired; the urine contains neither albumin nor other abnormal constituent. In acute septic cases, a considerable amount of albumin is usually present, and in some acute cases due to anæmia, in which no evidence of septicity can be found, albumin may also be present; in others no trace can be found. In uncomplicated chronic cases the urine will probably be concentrated, but it is often free from albumin. In our case a trace of albumin was detected once or twice, but as a rule albumin was absent. A few cases are recorded in which hæmaturia occurred. On several occasions, in our case, the urine was found to contain a considerable amount of urobilin and hæmatoporphyrin; uroerythrin was also observed to be present in excess; all three pigments were probably due to derangement of the hepatic function.

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THE RELATIONS OF THE INSANITIES TO CRIMINAL RESPONSIBILITY AND CIVIL CAPACITY.

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VI.

(*Continued from Volume XV. page* 416.)

In considering how far insanity limits and modifies criminal responsibility, we must show, at the outset, that the English law stands in a somewhat peculiar position with regard to this question. Its definitions are sharp and clear, and have remained unchanged for a very long time. They date from a period when the nature and effects of insanity were comparatively unknown, and they are in thorough consonance with the earliest popular views on the subject. But on certain points they are condemned with entire unanimity by those who have made a special study of insanity.

While, therefore, we must in the first instance state the existing law, we shall necessarily find ourselves discussing views which are still the subject of controversy.

The first English writer who defined with precision the position of insanity in the criminal law was Hale. The law prior to his time might be summed up in the statement that he who was *non compos mentis*, of "non sane memory," could not be found guilty of a crime, nor could he in that condition be tried, or the sentence executed. These phrases included none but the extreme forms of insanity. They meant an entire deprivation of reason, an "absolute madness and deprivation of memory."[1] Hale's treatment of the subject deserves careful consideration, as it forms the real basis of the subsequent law. He treats it under the general head of the "Incapacities of Persons and their consequent exemption from penalties," and lays down the common basis of these incapacities as follows:—"The consent of the will is that which renders human actions either commendable or culpable; as where there is no law there is no transgression, so regularly where there is no will to commit an offence there can be no transgression, or just reason to incur the penalty or sanction of that law instituted for the punishment of crimes or offences. And because the liberty and choice of the will presupposeth an act of the understanding to know the thing or action chosen by the will, it follows where there is a total defect of the understanding there is no free act of the will in the choice of things or actions. But general notions or rules are too extravagant and undeterminate, and cannot be safely in their latitude applied to all civil actions; and therefore it hath always been the wisdom of states and lawgivers to prescribe limits and bounds to these general notions, and to define what persons and actions are exempt from the severity of the general punishment of penal laws in respect of their incapacity or defect of will."[2]

Hale thus lays down as the basis of responsibility the free action of the will, and the impossibility of the free action where there is a total defect of the understanding; but since so general a statement is too loose for practical application, there are certain grounds alone, and among these insanity, from which the law will infer the defect of will. He does not contemplate the possibility of the free action of the will being impeded otherwise than through defect of intelligence, and indeed, as might be expected, he shows himself but little acquainted with the nature of mental disease. But, on the other hand, he indicates a marked advance on the earlier writers by his much wider interpretation of the defect of intelligence which created incapacity, and by his recognition of cases of insanity which he called partial, lying outside the boundary of responsibility, which were exceedingly difficult to distinguish from those which were exempt from punishment. "There is," he says, "a partial insanity of mind and a total insanity. The former is either in respect of things *quoad hoc vel illud insanire;* some persons that have a competent use of reason in respect of some subjects, are yet under a particular dementia in respect of some particular discourses, subjects, or applications; or else it is partial in respect of degrees; and this is the condition of very many, especially melancholy persons, who for the most part discover their defect in excessive fears and griefs, and yet are not wholly destitute of the use of reason; and this partial insanity seems not to excuse them in the committing of any offence for its matter capital; for doubtless most persons that are felons of themselves or others are under a degree of partial insanity when they commit their offences; it is very difficult to define the indivisible line which divides perfect and partial insanity, but it must rest upon circumstances duly to be weighed and considered both by the judge and jury; lest on the one hand there be a kind of inhumanity to the defects of human nature, and on the other side too great an indulgence given to great crimes; the best measure that I can think of is this: such a person as labouring under melancholy distempers hath yet ordinarily as great understanding as ordinarily a child of fourteen years hath, is such a person as may be guilty of treason or felony." The standard thus applied by Hale is of course, as a rule, quite inapplicable to insanity, but it certainly indicates a tendency to interpret very liberally the meaning of total incapacity. And it must be observed that it is applied only to the insanity which is partial in degree, not to that which is partial in respect of its subject, to which latter, it would appear, so far as it reached, he would accord the immunity of total insanity. On the whole, therefore, Hale deserves the credit of making a great stride in the legal treatment of insanity, not merely in the way of laying down the general principles upon which exemption is based, but also in his more liberal conception of its nature. His faults were invisible at the time. A chief influence for evil, however, which he undoubtedly did exercise over English law, lay in his conception of defect of understanding as the solitary ground which could hinder the free exercise of the will. Emphasising this point in the manner in which he did, led inevitably to the very narrow conception of the later English law.

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[1] Coke, Inst. iii. p. 6.

[2] Hale, "Pleas of the Crown," i. c. 2.

The principles thus laid down by Hale have, on the whole, been carried out consistently in the English judicial decisions. The courts have invariably looked to the understanding, and when it appeared that the accused knew that he was committing a crime, they have refused to look at any other side of the alleged insanity. The early cases are few, probably because it had to be a glaring case indeed before the question of insanity was raised or considered.

The first prominent case was that of Arnold, who was tried for shooting Lord Onslow in 1724.[1] There could be no doubt that Arnold was mad, but he exhibited some symptoms of plan and deliberation in the commission of the crime. Justice Tracy dwelt particularly on the evidence of design, and remarked with reference to the defence of insanity, that—"If he was under the visitation of God and could not distinguish between good and evil, and did not know what he did, though he committed the greatest offence, yet he could not be guilty of any offence against the law whatever, for guilt arises from the mind and wicked will and intention of the man." The question was put to the jury in these terms: "Whether the evidence doth show a man who knew what he was doing, and was able to distinguish whether he was doing good or evil, and understood what he did." Arnold was convicted, and afterwards respited at the instance of Lord Onslow. His trial is instructive as being a good example of what even a fair trial might be at a time when the subject of insanity was so little understood. Its chief characteristic is the weight given to the evidence of general conduct and capacity for intelligent action, as compared to the slight attention given to his delusions about Lord Onslow, and his motives for the crime. This does not, however, mean, as some writers appear to suppose, that the earlier English law considered that the accused showed sufficient intelligence to be capable of guilt, if he knew that the act he committed was in the abstract a crime. It merely showed the common mistake in point of fact that insanity was uniform in its action, and that it was safe to conclude from a man's intelligence on one point that he was equally intelligent on all.

The next case was that of Lord Ferrers in 1760,[2] which is notable as the first instance in which properly expert evidence was produced in defence, and in which a perplexing type of insanity rendered the case unquestionably difficult. In Bellingham's case in 1812,[3] Sir James Mansfield charged the jury that the question was "Whether you are satisfied that he had a sufficient degree of capacity to distinguish between good and evil, and to know that he was committing a crime when he committed this act."

In all these cases the defence was disregarded. The first great case in which it was given effect to was that of Hadfield, for shooting at George III., in 1812,[4] which is especially memorable for the great speech of Erskine, in which he attempted to break away from the old lines. This speech was probably dictated by the special exigences of the case. Hadfield exhibited every mark of care and design in carrying out his plan, and he understood, moreover, that his act was a crime, for the very motive which actuated him was that he might die on the scaffold; but, on the other hand, he was impelled to it beyond all doubt by an insane delusion. Erskine therefore took up a ground which was exceedingly narrow, but which suited him exactly. He maintained that the true test of insanity was delusion, and that it was necessary that the act should be the offspring of the disease. This view was not confirmed by the presiding judge, and in most respects it would have been a retrograde step. Its chief importance lay in its bringing into prominence the possibility of insane delusion co-existing with rational action in other respects.

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[1] 16, "State Trials," 775.

[2] 19, "State Trials," 885.

[3] See note to Offord's Case, 5 C. & P. 168.

[4] 27, "State Trials," 1281.

In the case of Offord in 1831 (5 Car. & P., 168), a case of marked delusion of persecution, the prisoner was condemned under a statement of the law by Lord Lyndhurst; while in the case of Oxford in 1840 (9 Car. & P., 525) an acquittal was obtained, although there was no evidence of delusion, nor any proof that the prisoner did not know his act to be a crime; and in this case the charge of Lord Denman exhibited considerable doubt as to the propriety of the investigation being confined to the condition of the understanding.

All possible doubt as to the law was, however, removed by the case of Macnaughton in 1843 (10 C. & F., 200), and the proceedings which followed it. Macnaughton, while apparently able to conduct his affairs rationally, and preserving the outward appearance of sanity, was subject to delusions of persecution, and under the influence of these he shot Mr. Drummond in mistake for Sir Robert Peel. Sir Alexander Cockburn, in defending the prisoner, took the same line that Erskine had taken in the case of Hadfield. He dwelt strongly on the entire compatibility of an apparently sane life with the existence of the wildest delusion, and stated his position to be that the commission of the crime was wholly due to the insane delusion. The medical evidence unanimously supported this view, and the case was practically withdrawn by the prosecution. But the Chief Justice (Sir Nicholas Tindal), while approving of the course that was taken, put the question to the jury in terms which were taken from the previous law, and which, if literally followed, would have resulted in condemnation. The acquittal in this case produced considerable excitement, as it seemed to point to a conclusion which many regarded as too broad; and, the matter having been raised by Lord Brougham in the House of Lords, a series of questions was put by the House to the judges, with a view of determining conclusively what was the existing law; which questions, although specially directed to the effect of delusion, involved a settlement of the whole law on the subject.

The answer to these questions (10 C. and F., 200, 1 C. and R., 131) may be considered as containing the law on the subject. The whole of the judges concurred in them except Justice Maule, whose separate answer, however, does not appear to have been prompted by any essential difference of opinion, but by a doubt as to the possibility or propriety of laying down the law in that abstract form, without argument, and without reference to special cases. The general statement of the law is to be found in the answer to the second and third questions. "The jury ought to be told in all cases that every man is to be presumed sane, and to possess a sufficient degree of reason to be responsible for his crimes, until the contrary be proved to their satisfaction; and that, to establish a clear defence on the ground of insanity, it must be clearly proved that, at the time of committing the act, the party accused was labouring under such a defect of reason, from disease of the mind, as not to know the nature and quality of the act he was doing, or if he did know it, that he did not know he was doing what was wrong. The mode of putting the latter part of the question to the jury on these occasions has generally been, whether the accused at the time of doing the act, knew the difference between right and wrong; which mode, though rarely, if ever, leading to any mistake with the jury, is not, as we conceive, so accurate when put generally and in the abstract, as when put with reference to the party's knowledge of right and wrong in respect to the very act with which he is charged. If the question were to be put as to the knowledge of the accused, solely and exclusively with reference to the law of the land, it might tend to confound the jury, by inducing them to believe that the actual knowledge of the law of the land was essential in order to lead to a conviction; whereas the law is administered upon the principle that every one must be taken conclusively to know it, without proof that he does know it. If the accused was conscious that the act was one which he ought not to do, and if that act was at the same time contrary to the law of the land, he is punishable; and the usual course, therefore, has been to leave the question to the jury, whether the party accused had a sufficient degree of reason to know that he was doing an act that was wrong; and this course, we think, is correct, accompanied with such observations and explanations as the circumstances of each particular case may require."

The special case of insane delusions, co-existing with apparent soundness of intellect, was dealt with in a manner logically consistent with this leading position. The fourth question was, "If a person under an insane delusion as to existing facts commits an offence in consequence thereof, is he thereby excused?" "To which question," say the judges, "the answer must of course depend on the nature of the delusion; but making the same assumption that we did before, namely, that he labours under such partial delusion only, and is not in other respects insane, we think he must be considered in the same situation as to responsibility as if the facts with respect to which the delusion exists were real. For example, if under the influence of his delusion, he supposes another man to be in the act of attempting to take away his life, and he kills that man, as he supposes in self-defence, he would be exempt from punishment. If the delusion was that the deceased had inflicted a serious injury to his character and fortune, and he killed him in revenge for such supposed injury, he would be liable to punishment."

According to the older authorities, the law of Scotland is substantially the same as that of England. Hume states that, in order to serve as a defence, insanity must amount to an absolute deprivation of reason (Commentaries, c. 1), but he carefully guards himself against the supposition that a mere abstract knowledge of good and evil is a relevant answer to the defence. Alison says that "to amount to a complete bar of punishment, either at the time of committing the offence, or of the trial, the insanity must have been of such a kind as entirely to deprive the prisoner of the use of reason, as applied to the act in question, and the knowledge that he was doing wrong in committing it. If, though somewhat deranged, he is yet able to distinguish right from wrong, in his own case, and to know that he was doing wrong in the act which he committed, he is liable to the full punishment of his criminal acts."[1] In the cases of Gibson (2 Brown, 332) and Smith (2 Irvine, 1), the Lord Justice-Clerk Hope expressly adopted the opinions of the judges in Macnaughton's case as representing correctly the law of Scotland as well as that of England. In Bryce (4 Irvine, 506), Lord Colonsay said, "It is a question of fact whether the insanity amounted to this, that he was doing a thing which he himself considered, and had ground to believe, and respecting which his belief was a sincere one, that he was warranted in doing; whether he really believed that something had occurred which would be a ground for taking away the life of this unfortunate girl. I can by no means endorse the doctrine that seems to be held, that when a man cannot control his disposition to do an act, he is not responsible for it."

But later there appears to be a considerable variation in the terms of directions to juries. In the case of Mylne (4 Irvine, 301), the Lord Chief Justice-General Inglis said: "If a person knows what he is doing, that is to say, if he knows the act he is committing, if he knows also the true nature and quality of the act, and apprehends and appreciates its consequences and effects, that man is responsible for what he does. If, from the operation of mental disease, he does not know what he was doing, or if, although he knows what is the act he is performing, he cannot appreciate or understand its nature or its quality, its consequences or its effects, then he is not responsible. Mr. Scott was, I think, quite right when he said that if you are once satisfied that the man is under the influence of an insane delusion at the time the act was committed, you have no occasion to inquire further, whether he knew what was right from what was wrong, or whether he knew what was murder in the eye of the law, because if he was in point of fact at the time under the influence of insane delusions, the law at once presumes from that that he cannot appreciate what he was doing." In the case of M'Fadyen (3 Irvine, 650), Lord Cowan directed the jury to consider "whether the panel possessed intellect enough to know the distinction between right and wrong, and that in the very commission of the crime charged, and at the time, or, if he knew that distinction, was he under disability from want of sufficient rational power to govern his actions, and to control his emotions and desires?" In the case of Tierney (3 Couper, 152), Lord Ardmillan said: "If there was a recurrence of the disease depriving the man of the power of controlling his actions, impelling him irresistibly to commit certain actions, that excluded responsibility." In Clafton (2 Couper, 73), the Lord Justice-Clerk Moncreiff said: "All that I have to state to you in the shape of a direction of law is this, that if the prisoner was of sound mind when she committed this crime, she is responsible for its consequences, but if she committed it when of unsound mind she is not responsible." Later in his charge, however, he pointed out that "the distinction between a man whose want of control arises from his evil inclinations, or his passions, or his desire for enjoyment, or his feeble self-denial or self-restraint, and one whose want of control arises from a morbid state of mind, is quite clear." Lastly, in M'Clinton (4 Adam, 1) the Lord Justice-General (Lord Kinross) charged the jury that "in order to exempt from criminal prosecution and liability to punishment, insanity must amount to such an alienation of reason that the panel did not know the nature and quality of the act which he was committing, or that, if he did know its nature and quality, he was in such a state of mind that he was not aware that it was wrong."

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[1] "Prin. of Criminal Law," p. 654.

It appears from these opinions that there are considerable differences among the Scottish authorities. The older authorities hold the same view as the English law, and so also, apparently, does the present Lord Justice-General in the most recent case that we have quoted. Lord Justice-General Inglis, while adhering to it in the main, indicates an important difference on the point of delusions. Lord Cowan and Lord Ardmillan admit the consideration of want of control, which Lord Colonsay had expressly repudiated; while Lord Moncreiff, though he puts the legal question in a form which seems identical with the old *non compos mentis*, in effect admits the consideration of "uncontrollable impulse" where that is shown to arise from a morbid state of the mind.

(*To be continued.*)

REVIEWS OF BRITISH AND FOREIGN LITERATURE.

Die Arhythmie, als Ausdruck bestimmter Funktionsstörungen des Herzens. Eine physiologisch-klinische Studie. Von Dr. K. F. **Wenckebach**, Professor der inneren Medizin, Groningen. Leipzig: Wilhelm Engelmann.

In the above work the author presents us with the solution of many of the mysteries that surround the action of the heart. It is now apparent that the reason that so little advance has been made in explaining the nature of the various forms of the heart's irregular action, was due to the fact that physiologists had hitherto failed to teach us the real nature of the heart's action. The remarkable researches of Gaskell and Engelmann have established the fact that the heart muscle fibres possess all the attributes necessary for carrying on the heart's work, and the vagus and sympathetic nerve fibres have merely a regulating action. The author sets out here the facts that favour the "neurogenic" and "myogenic" theories of the heart's action. Accepting the myogenic theory, he explains the functions inherent in the fibres of the heart muscle, as rhythmical creation of stimulus, susceptibility to stimulation, the power of conducting a stimulus from fibre to fibre, and the power of contraction. During systole these functions are all destroyed for the time being, but gradually return during diastole. Before entering into the consideration of the forms of arrhythmia, dependent on interference with these functions, he enters at length into the consideration of the "extra systole." While the four functions above enumerated are inherent in all heart muscle fibres, it is at the great veins the excitability returns soonest after systole, and is essentially rhythmic in its origination. Hence the inception of the rhythm of the heart is taken up by the fibres in this neighbourhood. But, under abnormal conditions, the stimulus may first arise in the ventricle. If so, then the ventricle contracts prematurely, and we have the occurrence of a pulse, but at a shorter interval than usual after its fellow. This premature pulse-beat is called an "extra systole," and is usually followed by a lengthened (so-called compensatory) pause. The reason for this pause is, that the physiological stimulus, coming down from the great veins immediately after the extra systole, finds the ventricle not yet recovered from the annihilation of its function, *i.e.* it is refractory, and so the ventricle does not contract, but remains quiescent till the next physiological stimulus arises. How an extra systole may arise also in the auricle, how the duration of the compensatory pause may vary, and how other conditions modify the character of the irregular period, are set forth in a lucid and interesting fashion.

Perhaps the fascinating portion of the book is where the author demonstrates the disturbances of the power of the stimulus conduction. Here the stimulus arising in the great veins is delayed in its transmission to auricle and ventricle. As the stimulus is rhythmically produced, it takes a longer and still longer time to reach the ventricle, until finally the ventricle fails to respond for one beat. The pause that follows gives the ventricle time to recover, and the next following stimulus is conveyed at the normal rapidity, and hence the ventricle contracts at its normal time. After this systole the power of conduction is depressed, so that the following ventricular systoles are delayed until another beat is missed, and the cycle of allorrhythmia goes on. This condition is traced onwards to its connection with that remarkable form of bradycardia that goes by the name of Stokes-Adams disease, where the auricle can be demonstrated beating at regular intervals, but where the ventricular systole is often delayed for long periods of time. One can only mention here some of the many interesting points dealt with, such as how the pulsus alternans is an evidence of disturbance in the contractility, while the true pulsus bigeminus is a "bigeminal action" of all the chambers of the heart, and is quite distinct from the pulsus alternans on the one hand, and from that form of pulse irregularity where an extra systole alternates with a normal systole—the usual but misnamed "pulsus bigeminus." Although the proof for all these statements may not be considered in all cases adequate, yet one must admire the penetrating insight and originality with which the author supports his views.

The last portion of the book deals more particularly with the arrhythmia due to the action of the nerves on the heart, and the facts he deals with, and the illustrations he gives, are all handled in the same masterly and interesting manner.

We congratulate the author upon giving us a volume that will certainly be the guide to a clearer and more scientific conception of the nature of many cardiac phenomena. JAMES MACKENZIE.

The Surgical Diseases of the Genito-Urinary Organs. By E. L. KEYES, A.M., M.D., LL.D.; and E. L. KEYES, Junior, A.B., M.D., Ph.D. of New York. New York and London: D. Appleton & Co.

THE work before us bears on its title-page that it is a revision of Van Buren and Keye Text-Book, originally published in the sixties. In view of the advances made in genito-urinary surgery since the book first appeared, it is not matter for wonder that the present issue bears little resemblance to its predecessor. It may in fact be looked upon as a new work, so complete and thorough has the reconstruction been.

The first fourteen chapters are devoted to the surgery of the urethra, beginning with a useful résumé of the anatomy and the congenital malformations of the canal. The short chapter on "Urethral Chill" is somewhat disappointing, the authors, by a clever manipulation of terms, such as "urethral shock," "urethral fever," "urethral chill," "shock to the kidneys," etc., avoiding the essential question of the nature of the condition. The general confusion is added to by the enigmatic statement, that "the best treatment for urethral chill is prophylaxis," and the inclusion under this head of such measures as the establishment of drainage "through the loin, the perineum, or the retained catheter."

One of the most valuable sections is that devoted to the consideration of gonorrhœa. It extends to over a hundred pages, and, to render the subject complete, a chapter has been added on extra-genital and metastatic gonorrhœa. The result is a thorough and practical presentment of the modern views of this affection. The authors, however, have not been able to avoid that tone of facetious flippancy which this subject seems to induce in so many writers. At the risk of appearing to lapse with them, we may indicate some of the passages which have left this impresson on our mind. We are told, for example, that "True gonorrhœa requires no idiosyncrasy, no ale nor champagne, no excess, no weakened condition of the urethra for its development, but simply . . ." Relapsing gonorrhœa is said to be "more annoying to the surgeon than to the patient. It is especially provoking when a patient leaves town, with all the evidence of a cure, to have him wire from the first station he stops at that his discharge is in full blast." Again, the authors go out of their way to cast ridicule on the use of cod-liver oil in the treatment of pulmonary tuberculosis, apparently for no other reason than to find an opportunity of saying that "the cod-liver oil would do more good if rubbed upon the boots." We might quote from this section many other examples of such misplaced levity, but we refrain. We cannot, however, pass without protest the gross want of taste which permitted American authors to drag one of Poe's most beautiful lines into a description of the symptoms of gleet.

The affections of the prostate are fully described, but we should have expected, in a work of this kind, a more exhaustive discussion of the operative measures for removal of the enlarged gland, particularly with regard to the respective merits of the suprapubic and the perineal operations.

The chapters on the bladder, particularly that on cystitis, are full and instructive; on the question of ureteral catheterisation, the authors adopt a conservative attitude, the subject, they say, not yet being "logically judged by experience, nor sufficiently tried in the furnace of statistics." We doubt if the writers of a work of the scope of that under review are entitled to dispose of this important subject so summarily.

The section on the kidney, so far as it goes, is satisfactory, but it is not up to the standard of a modern work. The anatomical diagram on p. 504 (copied from Treves) is obviously wrong, as, among other things, it places the right kidney higher than the left. In this it is contradicted by the figure, after Sappey, on the opposite page, and by the text. The work of Israël on hydronephrosis appears to have been overlooked by the authors, and the section on this subject is therefore wanting in completeness.

The authors adhere to the non-operative treatment of hydrocele, and strongly advocate the method of injecting carbolic acid into the sac.

While drawing attention to these few defects in this work, we would not overlook its many good points. It contains much valuable information, and embodies the wide experience of surgeons who are entitled to write with authority. The type is bold and clear, the illustrations are numerous, well selected, and artistically executed, and the index sufficiently full to render reference easy.

ALEXANDER MILES.

Descriptive Catalogue of the Anatomical and Pathological Specimens in the Museum of the Royal College of Surgeons, Edinburgh. By THEODORE SHENNAN, Conservator, Fellow of the College. Vol. III. Edinburgh: Oliver & Boyd.

THIS, the third volume of the *Catalogue of the Museum of the Royal College of Surgeons of Edinburgh,* completes the revision inaugurated by Mr. C. W. Cathcart some years ago. It deals with the male and female generative organs, mamma, heart and blood vessels, respiratory system and pleura, liver and gall bladder, spleen and ductless glands, and animal parasites. The most superficial examination abundantly demonstrates the wealth of material contained in this important collection; but to appreciate fully the value of the catalogue, compiled with such care by Messrs. Cathcart and Shennan, it is necessary to visit the museum and study the specimens with its aid. This we have done on many occasions, and can testify to the success which has attended the efforts of the conservators to make the museum a great teaching medium for the Edinburgh School. Throughout the three volumes the specimens wanted to make the collection complete are indicated, and we would take this opportunity of appealing to the Fellows of the College to aid the present conservator in filling the gaps.

ALEXANDER MILES.

Dr. Jessner's Dermatologische Vorträge für Praktiker. Heft 1, "Des Haarschwunds, Ursachen und Behandlung," Vierte Auflage; Heft 12, "Die Syphilide (Syphilis der Haut und Schleimhaut)." II. Teil, "Therapie." Wurzburg: A. Stuber's Verlag. 1904.

AN agreeable and telling way of presenting a subject to a medical audience is in the form of lectures, and these may either be collected in a single volume, or issued as separate booklets. The latter is the method which Dr. Jessner has adopted, and of a series of twelve, two have been selected and submitted to us for notice. Both deal with topics of interest and importance. Loss of hair is regarded as a calamity by one sex, and hardly with equanimity by the other. In his brochure on this, most of the causes which lead to baldness, whether temporary or permanent, are touched on, though some more fully than others. Of these, that associated with seborrhœa occupies the largest space. He does not accept unreservedly the microbian origin, holding that even were this admitted, there are favouring constitutional conditions. The remedies are well chosen, but on the familiar lines, while an array of formulæ are provided, on which the necessary changes may be rung. He believes that there is a neurotic as well as a parasitic type of alopecia areata, but no indication is forthcoming whereby a decision as to which category an individual case should be assigned. He regards chrysarobin as the most efficient remedy, while admitting its undoubted disadvantages.

The treatment of syphilis has now pretty well settled down to the best modes of using mercury and iodine. But there are many subsidiary questions which crop up more or less obviously in all cases, and answers to those will be found given very explicitly. At what stage of the disease one ought to commence the treatment, how it should be varied under exceptional circumstances, the advantages and drawbacks of the different methods, how long it should be persevered in, and the general management of the patient throughout, will all, and much more, be found clearly and tersely laid down. In its seventy-two pages the busy practitioner will find all the essentials needed for dealing efficiently with a very serious and much too common disease.

W. Allan Jamieson.

Diseases of Women. By A. L. Galabin, M.D., F.R.C.P. Sixth Edition. London: J. & A. Churchill.

The present edition is practically a new work. Coming as it does from so well known an authority, it is sure to be read with interest as being a reliable guide to the present-day teaching on the subject with which it deals. In describing the after-treatment of abdominal section, Dr. Galabin does not object to the administration of morphia as a sedative during the forty-eight hours following operation, and he advocates early evacuation of the bowels. He writes well on the use and abuse of pessaries, Hodge's pessary being the most generally useful. Although cautious in recommending operation in fibroids of the uterus, one infers that he rather favours operative treatment, giving preference to supra-vaginal hysterectomy. He is satisfied that the vaginal route is still the best one in dealing with cases of carcinoma of the cervix. The subjects of hæmatocele and intra-peritoneal hæmorrhage are fully dealt with. The book contains a great deal of valuable clinical information. The illustrations, including twenty-three photo-micrographs, are for the most part well executed, and the letterpress is excellent. It is a book which, to both student and practitioner alike, will prove helpful, and we cordially recommend it as one of the best up-to-date books upon diseases of women.

J. A. C. Kynoch.

NOTES ON BOOKS.

In his *Clinical Studies in Syphilis* (*The Medical Times Ltd.*, London, 1904), Mr. Arthur H. Ward endeavours to correlate the clinical phenomena of syphilis with the hypothesis that the disease is essentially due to the action of a micro-organism and its toxins. While admitting that the specific microbe has not yet been isolated, he bases his argument on the close analogies which exist between syphilis and other diseases which have been proved to be of bacterial origin. The clinical history of the disease is considered in a systematic manner, and the phenomena are explained on the "Microbe-Toxin Theory," as the author styles it. We must say that we are impressed by the ingenuity of his contentions rather than by their novelty, as we have for long assumed this causation of syphilis as the only one in consonance with modern ideas of pathological processes. Mr. Ward's exposition of the theory is, however, none the less interesting, and the reader will find his pages most suggestive. We confess that we like Mr. Ward best when he is not engaged in fine writing, and in saying this we have not forgotten the appeal to the reader with which he finishes his somewhat florid peroration.

Two volumes of the "Students' Aid Series" have recently been re-written—*Aids to Chemistry*, by T. A. Henry, D.Sc., London, and *Aids to Surgery*, by Joseph Cunning, M.B., B.S., F.R.C.S.Ed. (Baillière: London, 1904). These works are intended to facilitate revision before examinations, and, so far as we can judge, they will serve this purpose. The student who knows all that is contained in Dr. Henry's work will be entitled to pass his examination in chemistry, but he who knows no more of surgery than is embraced in the other volume is but sparingly equipped for the practice of his profession.

An essay on *Squint occurring in Children*, by Edgar A. Browne, F.R.C.S.Ed. (Baillière: London, 1904) contains the author's views on this important condition. It is based on an extensive experience, and its value is enhanced by the fact that the author has been able to follow the progress of a number of his patients from childhood to adult age.

Practitioners who dispense their own medicines will find Dr. W. G. Sutherland's *Dispensing made Easy* (John Wright & Co., Bristol, 1904) of great value. The writer has succeeded in laying down a few simple rules which render the dispensing of a large number of prescriptions in a limited time both accurate and rapid. With a view to effecting economy, without sacrificing therapeutic efficiency, a series of less expensive substitutes for pharmacopœial preparations are suggested, and throughout the book "preference has been given to simple rather than complex formulæ, and the cheaper rather than to the dearer drugs and preparations, in cases where they both seemed to be of equal therapeutic value."

RECENT ADVANCES IN MEDICAL SCIENCE.

MEDICINE.

UNDER THE CHARGE OF
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Diseases of the Locomotory System.

Spondyloze Rhizomélique.—Gordon (*Med. Rec.*, N. Y., 1904, Feb. 13) reporting three cases of this disease (the chief feature of which is spondylosis or rigidity of the spine), originally described by Bechterew in 1892, and Marie and Strümpell in 1898, says that two forms have been described—(1) Ankylosis of the cervical spine with meningomyelitis; (2) ankylosis of the spine and large proximal joints without cord affection. The former (Bechterew's disease or heredo-traumatic kyphosis) occurs from trauma in those hereditarily predisposed to it; its onset is abrupt, it is limited to the upper part of the spine, and it consists in a thickening of the cervico-dorsal meninges, causing atrophy of the spinal ganglia and degeneration of the roots and posterior columns, resulting in paresis of muscles and kyphosis. In Strümpell and Marie's type no lesions have been found in the cord, but only changes in the spine like those of osteo-arthritis. Later observations have shown that transitional forms occur, and some hold that the condition is merely a manifestation of arthritis deformans. Gordon, however, does not think that a "rheumatic" factor is always present, and, especially in Bechterew's type, the clinical picture is not suggestive of rheumatism. His cases are as follows:—(1) Female, æt. 54, in whom painless rigidity of the spine and then of the other joints set in, after repeated attacks of vertigo and unconsciousness. On examination, her chief symptoms were partial ankylosis, but no enlargement, of nearly all the joints in the body, spastic ataxic gait, Duchenne-Aran type of muscular atrophy in the arms, with increase of the tendon reflexes in the legs, and Argyll Robertson pupil. Mastication, articulation, mimetic facial movements, and the function of the sphincters were impaired. Such a case as this resembles Bechterew's disease in the presence of cord symptoms (especially the amyotrophy), but not in their distribution, while in the extensive spondylosis and joint affection it approached the Strümpell-Marie type. (2) The patient, also æt. 54, received an injury to the neck fifteen years earlier. It was followed by pain, muscular wasting, and stiffness of the cervico-dorsal spine and proximal joints, and resulted in typical amyotrophic lateral sclerosis, plus involvement of the sphincters, along with rigidity of the entire spine, cervico-dorsal kyphosis, and ankylosis of the large joints. This again was a mixed type of the disease. (3) The patient, æt. 43, thirteen years before had sustained an injury to the neck, followed by pain and stiffness, which extended until, in three years, the whole spine and hips and other joints became ankylosed. On examination he showed kyphosis, stiffness of the larger joints, muscular wasting with fibrillary tremor and reaction of degeneration, increased tendon jerks in the arms, abolition in legs. Gordon concludes that many diseases—tabes, syringomyelia, etc.—may give pictures of either Bechterew's or Strümpell-Marie's disease in some period of their evolution, that the condition is not therefore a pathological entity, and that the term spondylosis should be used to designate the symptom of rigidity of the spine, and the original names discarded.

Adler (*Centralbl. f. d. Grenzgeb. d. Med. u. Chir.*, Jena, 1903, December 9 and 24) reviews the SKELETAL CHANGES IN TABES DORSALIS. The purely trophic theory of the *pathogenesis of arthropathies* is supported by the relation between the affected joint and the seat of the cord lesion—the arthropathy of tabes affecting the legs, that of syringomyelia the arms. Bone and joint changes are due to the general nerve lesion and not to the special tabetic process, as is shown by the occurrence after cord injury, Pott's disease, lesion of the medulla, neuritis, etc., of hydrarthrosis, relaxation of the capsule, and disorganisation of the joints. Though of neurogenous origin, these arthropathies may arise, not from a severance of the joints from special trophic centres, but from an interruption of the nerve fibres conveying sensory impulses regulating the action of the muscles which surround the articulations. Such a view is supported by the fact that joint changes are most characteristic of diseases like tabes and syringomyelia, in which sensory changes are common. On the other hand, the latest investigations show histological changes only differing from arthritis deformans in the greater amount of destruction, while experimental section of nerves has hitherto failed either to cause trophic changes in joints or to interfere with the union of fractures. Possibly tabetic arthropathy is a true osteo-arthritis due to nervous disturbance. Degeneration of the peripheral nerves occurs in many of the nutritional disorders—anæmia, alcoholism, arterio-sclerosis, etc.—which predispose to arthritis deformans, and future investigations must take cognisance of the pathogenesis of both this disease and arthropathy. *Symptomatology.* —The onset, usually in the preataxic stage of tabes, is abrupt and painless, and the destruction of the joint is rapid, sometimes attaining its maximum in a few hours. The subcutaneous tissues become œdematous, but not hot nor red. In spite of the great disorganisation of the joint, its function is at first little impaired, and not until the capsule becomes loose and the joint flail-like is the patient incapacitated. Ultimately the joint surfaces either become polished and atrophic, or periarticular outgrowths of bone and calcareous deposits develop (hypertrophic form). The disease is usually bilateral and symmetrical; the knee, hip, and shoulders are by far the most common sites. By *radiography* it is possible to differentiate exactly between atrophic and hypertrophic forms, as well as to see the characteristic periarticular ossification. In skiagrams the stalactite-like deposits of bone in the capsule, tendons, and muscles, are seen far to exceed those of arthritis deformans, and may throw the alterations in the bones themselves into the shade. This "periarthropathy," along with great rarefaction of the bones, is characteristic of the disease. *Tabetic osteopathy.*—The absolute painlessness of the spontaneous fractures of tabes is even more striking than in joint affections. Recovery is extremely uncertain; consolidation may be rapid or very tedious, callus excessive or slight, and pseudo-arthrosis may occur. Like arthropathy, a fracture may be followed by multiple exostosis, or bony deposits in tendons and muscles. Fractures of the shaft unite better than diastases, which are often combined with joint lesions. A fracture may be the first sign by which tabes is detected; it may actually precede all other symptoms by some years. The femur and humerus are the favourite sites. *Tabetic foot* is a combination of arthropathy and osteopathy, the latter preponderating. The deformity develops slowly and painlessly without loss of function at first. The foot becomes thickened, everted at the tarso-metatarsal joint, causing bad flat foot; sometimes, however, the deformity is an inversion, with raising of the arch. Tabetic foot may develop acutely. *Atrophy of the alveolar processes* and painless falling out of the teeth (usually the canines and premolars) may occur in tabes. The loss of the teeth is not preceded by periostitis, but may cause antral abscess. *Spinal affections* are rare; they develop slowly and painlessly, an apparently sudden onset being due to an already diseased vertebra fracturing. Kypho-scoliosis usually results. *Treatment.*—The fact that any of these skeletal lesions indicates a general disease of the bones, the fear that wounds may heal badly, and the liability to cystitis and bed sore, alike make the cases unsuitable for operative measures, and indicate mechanical treatment. Periarticular œdema requires rest, massage, and bandaging; aspirin has been of use. As soon as the condition, particularly if a spinal lesion, is recognised, a support should be worn to prevent the deformity progressing. Resection of a joint seldom gives firm union, and a support is generally also required. Amputation is needed only in suppuration or when the joint is so disorganised as completely to cripple the patient. In hæmorrhage into the joint repeated puncture has succeeded, while suppuration indicates drainage.

OSTEOMALACIA.—Senile osteomalacia is discussed by Schiffmacher (*München. med. Wchnschr.*, 1904, March 29), who remarks that non-puerperal osteomalacia occurring in childhood and old age is of particular interest, on account of its resemblance to rickets in the one case and osteoporosis in the other. His case was that of a woman of 67, whose malady had lasted for about ten years. The sternum was much bulged forwards; there was marked lumbar lordosis and dorsal kypho-scoliosis, the chin resting permanently on the sternum. All the bones, especially the sternum and ribs, were tender; there was a fracture of the left femur; the pelvis and reflexes were normal. After death the bones were found abnormally soft; the ribs cut readily with scissors, and were so flexible as to be unbreakable. The vertebræ were also soft. The cranial bones were easily divided with the knife, and the distinction between the diploë and tables was lost. The pelvis and long bones, although unaltered in shape, were similarly affected. The marrow throughout was hyperæmic. Clinically, multiple myeloma was excluded by the absence of Bence-Jones' albumosuria, general carcinomatosis by the prolonged history, and senile osteoporosis by the duration, absence of brittleness, and deformity. The microscopic appearances were those of osteomalacia—excessive development of uncalcified osteoid tissue. The literature of the disease, which is rare, is discussed.

Under the title of TRAUMATIC OSTEOMALACIA, Lardy (*Rev. méd. de la Suisse Rom.*, Genève, 1904, February 20) relates a case which does not seem to fit into any recognised category. A girl, æt. 17, who was healthy at birth and walked at 1 year, broke her right femur when 2 years old by a fall from a height. Between the fifth and eighth years she sustained several fractures of her legs, all after trifling violence. When about 9 years old, curvature of the legs began to appear, and for the past three years the patient could only walk with crutches. A photograph shows extreme deformity of the legs (bending of the bones at a right angle), old hydrocephalus; no abnormality of the thorax, facial bones, and arms; no sign of rickets; slight pelvic flattening. The patient was treated by double oöphorectomy and a series of osteotomies—without much benefit. The bones cut readily, and microscopically were composed partly of compact, partly of spongy, badly developed bone. The combination of an apparently temporary condition of fragilitas ossium, with the subsequent development of softening and bending of bones, is very remarkable, and we do not remember any record of another such case. The histology was fully worked up; it does not seem to correspond exactly with osteomalacia.

TUBERCULOUS NATURE OF CERTAIN TYPES OF CHRONIC POLYARTHRITIS.—Edsall and Lavenson (*Am. Journ. Med. Sc.*, Phila., 1904, December) have made observations on the effect of tuberculin injections in eighteen cases of polyarthritis. Eight of these gave no reaction (mostly rheumatoid arthritis, these); three, cases of chronic rheumatism, gave a doubtful reaction; seven gave a definite positive reaction. The most important observations were made on a case of Still's polyarthritis of childhood (multiple swelling of joints with fever during the progress of the disease, and glandular and splenic enlargement). The patient reacted markedly, the temperature rose, the joints became painful, the glands swelled. Portions of excised gland, though not showing the structure of tubercle, yet swarmed with acid-fast bacilli, which the writers do not doubt were tubercle—of low virulence, or dead, however, as inoculation did not destroy guinea-pigs. They conclude that in this disease the joint affection precedes and causes the glandular enlargement, that the condition is due to the tubercle bacillus, but of lower virulence than usual. Children suffering from Still's arthritis have irregular pyrexia and glandular swelling, which, without arthritis, give a clinical picture of lymphatic tuberculosis.

NODULES IN CHRONIC RHEUMATISM.—Weiss (*Centralbl. f. innere Med.*, Leipzig, 1904, May 7) draws attention to the occurrence of painful nodular infiltrations of the muscles, apparently similar to those recently described by Stockman in this country, thus independently confirming the latter's observations.

ARTHRITIS DEFORMANS.—A valuable report of a series of 110 cases, by M'Crae, will be found in the *Journ. Am. Med. Ass.*, Nos. 1, 2, and 3, 1904.

SURGERY.

UNDER THE CHARGE OF

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Cervical Rib.

The literature of this comparatively rare condition has been summarised by Riesman (*Univ. Penn. Med. Bull. Phila.*, 1904, March) *apropos* of a recent case he has met with in a woman, æt. 65, who suffered from advanced pulmonary phthisis. The condition, which was discovered accidentally, was bilateral, the supernumerary rib on the right side being much larger than that on the left, so much so that the subclavian artery passed over it. There was no spontaneous pain, but on making compression over the subclavian the patient complained of pain radiating down the middle of the upper arm. This paper is concerned chiefly with the clinical aspects of the condition, and the author draws the following conclusions from his analysis of the recorded clinical cases:—(1) Cervical rib may exist without producing symptoms. (2) When present, the symptoms are local and functional. (3) The local symptoms are a hard prominence above the clavicle, and a visible pulsation high in the supra-clavicular fossa. (4) The functional symptoms are circulatory and nervous. (5) The principal circulatory symptoms are feebleness or absence of the pulse, coldness of the extremity, at times cyanosis, and œdema. (6) The principal nervous symptoms are pain in the distribution of the brachial plexus, together with paræsthesia, such as numbness and formication, and awkwardness in the use of the hand; in some cases weakness and atrophy. (7) In cases of brachial neuralgia the possibility of a cervical rib should be considered. (8) The treatment, except in the mildest cases, is excision of the rib. This was done in twenty-two out of forty-six cases, and in the majority with success.

Iodoform Injections in Septic Cystitis.

Freudenberg advocates the use of iodoform as an intravesical injection in cases of septic cystitis with fœtid and ammoniacal urine. The iodoform, he says, acts on the urine in contra-distinction to such drugs as silver nitrate, which acts on the vesical mucous membrane. After two or three injections the urine is free of the glairy masses, the ammoniacal odour disappears, the pain is less severe, and the frequency of micturition diminishes. After this improvement has taken place, and the urine has become acid, silver nitrate injections may be employed. The action is less certain in the presence of calculus in the bladder, a diverticulum of the bladder in which septic urine stagnates, or pyonephrosis. The presence of an enlarged prostate with retention does not contra-indicate the use of iodoform; on the contrary, it is in such cases that the best results are obtained by its use. The possibility of iodoform poisoning has to be borne in mind. About 3 c.c. of a 10 per cent. emulsion of iodoform in glycerin, diluted with 30 to 40 c.c. of boracic solution, are injected.—*Comm. made to the French Assoc. of Urology*, Paris, 1903.

THE ETIOLOGY AND MECHANISM OF INTRAPERITONEAL RUPTURE OF THE BLADDER.

DAMBRIN and Papin (*Ann. d. mal. d. org. génito-urin.*, Paris, 1904, May 1) record the results of an exhaustive inquiry into the subject of intraperitoneal rupture of the bladder, resulting from contusion of the abdomen apart from fracture of the pelvis. The present paper deals chiefly with the etiology and mechanism of the lesion. Contrary to the general belief, the authors find that rupture of the bladder is a comparatively common injury. They recognise three forms of traumatism by which the lesion may be produced—falls, blows, and crushes; a classification not altogether inconsistent with that of Bartelo, who says it occurs in drunkards, brawlers, and innocents. The height from which the patient falls varies in different cases, and as a rule the distance is not great. Usually the patient lands on his abdomen, striking against some hard and projecting body; but rupture has followed falls on the back, the feet, and the buttocks. Of blows, the most common are those with the fist or the foot. Crushes are usually due to the passage of a wheel over the abdomen, or to the patient being caught between the buffers of a waggon. Cases have been recorded in which the bladder was ruptured during parturition, the organ being crushed between the uterus and the pubes. In a few cases the bladder has been ruptured by sudden and violent contraction of the diaphragm and abdominal muscles, as for example in making a violent effort to lift a heavy weight. In the case of a healthy bladder the most important factor favouring rupture is distension with urine. The distension need not be extreme, although the accident is more likely to occur if the bladder has risen above the pubes and reached the abdomen. The recorded cases show, further, that the most common cause of the distension is alcoholic intoxication. The rupture is favoured by the fact that during intoxication the patient loses the sensation of desire to empty the bladder, and there is at the same time a certain degree of atony of the muscular fibres. This injury is much more common in males than in females—90 per cent. of cases occurring in men.

In the vast majority of cases the rupture is complete. When incomplete it is usually the serous coat that remains intact, a fact which would indicate that the tear takes place from within outwards. From 80 to 90 per cent. of ruptures by contusion of the abdomen are intraperitoneal, and the tear is usually on the upper and posterior surface of the organ. As a rule the rupture is simple, but cases have been recorded of multiple tears. The opening is usually antero-posterior, in or near the middle line, a few centimetres in length, and with clean-cut edges, the peritoneal aspect generally being more widely torn than the rest.

As regards the mechanism of the injury, the authors reject the view that it is produced by the bladder being driven against the promontory of the sacrum, as in that case the tear would be transverse, while in the great majority of cases it is antero-posterior, and the rupture does not take place at the point where the bladder would come in contact with the promontory, but higher up and further forward. Further, this theory would not account for the rupture following a fall on the back, the feet, or the buttocks. Similarly, the view that the shock applied to the anterior wall is transmitted to the posterior wall, which gives way, is untenable, as, according to the ordinary laws of hydrostatics, the pressure is increased equally at all points. From a series of anatomical and experimental observations, the authors show that there is near the summit of the posterior wall of the bladder a point where the muscular coat presents a special texture which weakens its resistance. The circular fibres converge on this point and form a whorl-like arrangement, in the centre of which they become attenuated. At this level also the longitudinal fibres are thin and scattered, and the mucosa is sometimes herniated between the bundles of muscle fibres. When the bladder is dilated this weak spot becomes stretched, and the resistance of wall is further diminished. As the bladder rises into the abdomen, its postero-superior part loses the support of surrounding structures, and, when extra strain is thrown upon it, tends to give way.

URINARY TUBERCULOSIS IN WOMEN.

HUNNER (*Am. Med.*, Phila., 1904, April 30), from a study of thirty-five cases of tuberculosis of the urinary system in women, comes to the following conclusions. Tuberculosis of the urinary system is a surgical disease, being, as a rule, unilateral, and often the only focus of tuberculosis in the body. If the disease is bilateral, the patient should be treated on the same lines as for tubercle of the lungs. Thickened ureters are usually tuberculous, and should be removed with the kidney, if the patient's condition justifies. Bladder disease in these cases is often non-tuberculous, and removal of the diseased area should not be attempted at the first operation. If the bladder fails to heal within a year under ordinary methods of cystitis treatment, the disease is probably tuberculous, and if not occupying more than half the bladder it should be excised.

OBSTETRICS AND GYNÆCOLOGY.

UNDER THE CHARGE OF

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CÆSAREAN SECTION FOR PLACENTA PRÆVIA.

DEAVOR (*Journ. Am. Med. Ass.*, Phila., 1904, No. 18) refers to Gillette's collection of 216 cases of placenta prævia treated by the ordinary methods, which shows the maternal mortality to be 15·3 per cent., and the fœtal mortality = 44·3 per cent. Further, Schauta collected 234 cases, showing maternal mortality = 6·8 and fœtal mortality 54·3 per cent. With such results Deavor believes that Cæsarean section may, in certain cases of placenta prævia, diminish greatly the fœtal death-rate without increasing very much the danger to the mother. He admits, however, that in cases demanding immediate attention, and where the patient cannot be removed to hospital, that such a line of treatment should not be preferred to version and extraction. He reports the following case :—P., æt. 41, 5-para ; previous labours instrumental ; had severe bleeding at the seventh month, treated by plugging. When admitted to hospital the os was the size of a florin, and the case was diagnosed as central placenta prævia. Ordinary conservative Cæsarean section was performed. Mother and child recovered. Deavor has collected previously recorded cases, and finds that, of twenty-four, nineteen mothers and eight children recovered, giving a maternal mortality = 20·8 and fœtal death-rate = 66·6 per cent. In view of such results being no better than cases treated by version, Deavor holds that Cæsarean section should not be unreservedly recommended, but limited to cases of placenta prævia, where (1) the cervix is with difficulty dilated, (2) there is any degree of pelvic contraction, (3) immediate extraction is deemed necessary, (4) further hæmorrhage would certainly kill either mother or child. The paper concludes with a reference to all previously published cases.

GYNÆCOLOGICAL RESULTS OF PLACENTA PRÆVIA.

Radtke (*Centralbl. f. Gynäk.*, Leipzig, 1903, No. 51) discusses the various pathological conditions which may result from this complication. Of eighty cases he found twenty-four (30 per cent.) remained sterile, the result of endometritis or salpingitis. Abortion occurred in twenty-three (29·75 per cent.). In subsequent pregnancies forty-five (56·25 per cent.) had healthy children, the labours being normal in twenty-nine, premature in six. Repeated placenta prævia was only met with twice. The general condition of the patients at a subsequent period was not satisfactory, fifty-seven being afterwards anæmic, and forty-nine more or less unfit for work.

MALIGNANT DEGENERATION OF CERVICAL STUMP, AFTER SUPRAVAGINAL HYSTERECTOMY FOR FIBROIDS.

Richelot (*Gynécologie*, Paris, 1903) reports three cases from personal observation, and refers to twelve previously published. He thinks supravaginal hysterectomy should be abandoned in the majority of cases, and limited to cases where, owing to uncertainty regarding the anatomical relations of the uterus, the complete operation would be more difficult. In the discussion which followed, opinion was almost unanimous that the supravaginal operation was easier, more rapidly performed, and safer than pan-hysterectomy. Pozzi stated that of fifty-seven cases he had three deaths, 5·25 per cent., as contrasted with a mortality of 9·50 per cent. in a series of forty-two pan-hysterectomies. The opinion was further expressed that the association of carcinoma and fibromata was very rare, and entirely a coincidence, any connection between the two being unsupported by any evidence.

GONORRHŒA DURING THE PUERPERIUM.

MARTIN (*Berl. klin. Wchnschr.*, 1904, No. 13) has observed thirteen cases where childbed was complicated with chronic gonorrhœa. Spontaneous recovery was general, and on this account Martin cautions against early operating. With a high temperature and hyper-leucocytosis, simple evacuation and drainage of the pus per vaginam is the best treatment. In other cases, general treatment, with lysol or thymol douches, is sufficient. Locally he found sterile yeast most effectual.

REMOVAL OF URETERIC CALCULUS PER VAGINAM.

GRADENWITZ (*Centralbl. f. Gynäk.*, Leipzig, 1904, No. 12) reports the following case:—P., æt. 43, 5-para. The bulging portion of the ureter was reached through an incision in the anterior vaginal wall, and pushed downwards and outwards by another incision higher up. The lower portion of the parametrium had previously been incised between two ligatures. The ureter was incised, and a calculus the size of a cherry-stone removed. The ureteric wound was sutured over a sound. At the end of three weeks both ureters were functioning normally.

LEUCOCYTOSIS IN DISEASE OF THE FEMALE REPRODUCTIVE SYSTEM.

BERARD and Descas (*Rev. de gynéc. et de chir. abd.*, Paris, tome vii. No. 1) summarise the significance of leucocytosis in disease of the female reproductive system. If the leucocytes number 12,000 or more, with 80 to 83 per cent. of the polymorpho-nucleated type present, suppuration is either present or the process is beginning. With 10,000 leucocytes per c.mm. present, pus is either absent, or, if it be present, is not virulent.

CONDITION OF THE BLOOD IN CYSTIC DISEASES OF THE OVARY.

POZZI and Bender (*Compt. rend. Soc. d'Obst., de gynéc. et de pediat.*, Paris, 1903) have studied the blood in a number of cases of benign and malignant ovarian cysts. Their conclusions are as follows:—When the examination shows that the red corpuscles are normal in number, and the leucocytes are between 6000 and 8000 per c.mm., the cyst is non-malignant. A moderate degree of leucocytosis, associated with a normal number of red blood corpuscles, does not prove that the cyst is malignant, as such a leucocytosis is frequently met with in cases where large cysts are present, and is constant when suppuration of the cyst takes place. Diminution of the number of red corpuscles, together with a leucocytosis of from 12,000 to 20,000, is suggestive of malignant disease. The anæmia is of far greater value as a diagnostic point than is the leucocytosis. The prognosis of operative treatment is poor in cases with marked anæmia and leucocytosis.

THERAPEUTICS.

UNDER THE CHARGE OF
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PANCREAS MUSCLE BLOOD EXTRACT IN DIABETES.

CROFTAN has shown that, while the simple extract of pancreas has no power of destroying sugar, a mixed extract of pancreas, muscle, and blood possesses a very marked effect on saccharine solutions. The tissues are fixed while still warm by immersion in alcohol. Five grms. of the extract, incubated for seventeen hours with saccharine solutions containing 0·2 to 1 per cent. of sugar, destroyed from 20 to 34 per cent. of the sugar. Similarly, when administered to diabetic patients, the extract seems to have an action. This has been tested in six cases, and in each case a sugar-destroying effect was noted, as shown by diminution in the output of sugar in the urine. To produce this action, large doses of the extract, over half an ounce, are necessary, since the preparation necessarily varies somewhat in its composition, and large quantities are required to ensure the presence of sufficient of the active bodies.

In the first case, on a strictly carbohydrate-free diet, the patient excreted 246 grs. of sugar in the day. Two oz. of the extract were then given for three days, and the sugar varied from 138 to 186 grs. On stopping the extract, the sugar rose again to 236 grs., but on taking 3 oz. extract it fell to 143 grs.

Case 2, on a rigid diet, passed 36 grs. daily; + 2 oz. extract this amount fell to 4·1, 3·7, 1·3; but next day, without extract, it was 27·4.

Case 3 was very instructive. This was a mild case, in which the withdrawal of carbohydrates caused the entire disappearance of sugar from the urine. The power of assimilating carbohydrates was 50·75 grms. of white bread, while 100 grms. produced 7·2 grs. of sugar. One hundred and fifty grms. produced next day 19·2 grs. sugar, and on the following two days 10·4 and 4·1 grs., the urine again becoming free from sugar on the third day. After the urine had remained free for six days, the patient was given 100 grms. bread and 2 oz. of the extract, but no sugar was passed.

Next day	150	grms.	+ 2 oz. extract	= no sugar.
,, ,,	200	,,	+ 2 ,,	= ,,
,, ,,	150	,,	without extract	= 12 grs. sugar.
,, ,,	150	,,	+ 2 oz. extract	= no sugar.

Evidently, while taking the extract the assimilation power for carbohydrates was increased. During the period that the extract was being administered the patient lost no weight. After the end of a week's treatment with the extract, the patient could take 100 to 125 grms. of bread, while the sugar excreted did not exceed 4 grs.

In the other three cases the action was similar, the boundary of assimilation being raised 50 to 80 per cent.

Croftan thinks that this may prove of value, since a course of the extract raises the assimilating power, and by giving a rest to the glycolytic processes may tend to restore them to the normal power.—*New York Med. Journ.*, 1904, May 7.

AMYL NITRITE IN HÆMOPTYSIS.

FRANCOIS HARE finds that inhalations of amyl nitrite instantaneously arrest hæmoptysis. He has tested the action in five cases, one of mitral obstruction and four of phthisis. In every case the inhalation proved successful, and the hæmorrhage stopped at once. He thinks it acts as follows. Normally, effusion of blood irritates the lung tissue, causing coughing. The strain of coughing raises the blood pressure, inducing fresh bleeding. In this way a vicious circle is maintained, till eventually the loss of blood becomes so great that the exertion of coughing no longer causes a marked rise of pressure. Then the bleeding ceases. Amyl nitrite, by dilating the vessels, accomplishes the same effect without the further loss of blood. It is similar in its action to the old plan of treating bleeding by venesection.—*Austral. Med. Gaz.*, Melbourne, 1904, Feb. 20.

ALCOHOL AND NITROGLYCERIN AND AMYL NITRITE IN SHOCK AND COLLAPSE.

CRILE (*Med. News*, N. Y., 1904, May 7) gives a summary in this paper of certain experiments which he has carried out on dogs in the normal state, and after the production of surgical shock. None of the drugs seem to have any effect in warding off or removing shock. In normal dogs, intravenous injection of alcohol causes an immediate fall of pressure, usually followed by a compensatory rise. The swing of the manometer is increased, but there is no evidence that the heart is strengthened. In animals suffering from shock, the usual effect of an average dose of alcohol is the production of a further depression. Small doses have no action. Very large doses cause great depression, and in several instances directly caused death. The blood pressure may fall as rapidly as with amyl nitrite. The more profound the shock, the more marked the depressant influence of alcohol. Administered prior to the shock-producing operation, it neither prevented subsequent shock nor diminished it. In animals suffering from deep shock, nitroglycerin and the nitrites had a depressant effect, distinctly increasing the gradual fall of pressure. In many cases the heart beat irregularly after the injection. On the whole, nitroglycerin and amyl nitrite increased shock.

CHAULMOOGRA OIL IN LEPROSY.

KUPFFER, as the result of his experiences in the leprosy hospital at Kuda, states that chaulmoogra oil has a distinctly favourable action on the disease. This effect is produced, howsoever the oil is used. If oral administration causes discomfort, or if a rapid reaction is required, subcutaneous injection should be resorted to. The oil may be given by the mouth in hot milk or in gelatin capsules, up to 3 drms., in the day. For subcutaneous use a dose of 15 minims is sufficient, thrice weekly. It should be injected into the extremities, under apparently healthy skin. Sometimes hard nodules form at the site of the injections. Patients who have not had the drug previously react with fever, lasting four or five days, reddening and swelling of the nodes and infiltrations. This local reaction is only obtained in the tuberculous form of leprosy, and only then if the patient has not had much of the drug previously. It is not obtained in the maculo-anæsthetic variety of the disease, though the spots here disappear rapidly and do not recur. It is essential to use a pure drug and to change the preparation frequently. Unna's keratin-coated pills of gynocard soap and sodium gynocardiate may be used along with chaulmoogra oil, and thus the patient may be kept under the action of the drug for years. By this means even severe forms may be reduced to latency, while slighter forms entirely disappear without leaving any traces. In all cases it is well to combine with the internal treatment energetic local measures.—*St. Petersb. med. Wchnschr.*, 1904, No. 17.

INHALATIONS.

GUNZEL holds that inhalations are the most important method of local treatment for the lungs. To penetrate the lungs, the inhaled substances must be in the finest state of subdivision. This may be effected by using a steam spray, or, better, superheated steam, which not only converts the fluid into aqueous substance, but also breaks it up into the finest particles obtainable. The action of an inhalation depends on the degree in which the diseased lung is functioning, and notably on its power of aspiration. As regards the composition of the inhalation, any substance which is to have a stimulating effect on the mucous membrane must be alkaline, otherwise the active movement of the cilia is interfered with. Acids and metallic salts precipitate mucus, and do not penetrate through the mucous coating of the bronchi. Sodium chloride and saline mineral waters stimulate the ciliary action, and favour expectoration by rendering the mucus more fluid. A suitable antiseptic to add to the saline spray is kresamin, an alkaline fluid, miscible in all proportions with water and a powerful germicide. It can be used as an inhalation in 5, 10, 20 per cent. solution. The author uses Siegle's spray, and an inhalation lasting ten to twenty minutes was given every second day. He has treated 350 cases of tuberculosis, and claims that in a large proportion, 68 per cent., a relative cure was obtained. In three or four weeks the general condition begins to improve, physical signs diminishing and the spit ceasing. While inhalations are unlikely to cure alone, they do good by preventing secondary infection with other organisms.—*Deutsche med. Wchnschr.*, Leipzig, 1904, May 5.

DERMATOLOGY.

UNDER THE CHARGE OF

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THE TREATMENT OF ECZEMA.

LASSAR (*Dermat. Ztschr.*, Berlin, 1904, February) states that the simplest conception of eczema—more correctly of the eczemas—is as the reaction of the epidermis-bearing surface against inadequate tissue irritation. As this is manifold in its nature, and the pathological results of irritation are not uniform, the essential unity of the essence of the disease disappears, and with it the possibility of laying down a constant method of treatment. Thus one must inquire as to the cause of every cutaneous inflammation resembling eczema, and adopt a corresponding symptomatic treatment. A carbolic or lysol eczema in a surgeon demands other treatment than the inpetiginous eczema of infants evoked by scratching. Eczema may manifest almost every variety of morbid change, and does not follow the customary scheme of redness, papulation, and pustulation, the formal advance of symptoms in regular stages. One observer finds a naturally arising or experimentally induced eczema completely bacteria-free, while others as competent have certainly proved the existence of a bacterially infectious variety. The pathological type, due to chemico-physical traumatisms, rapidly alters under the unavoidable influence of micro-organismal contamination. Purely parasitic inflammations (set up by fission fungi) disturb the surface and give rise to exudations, change the general condition of the tissues, lay bare the previously protected lymph canals, so that various chemical substances from without make their way in. Lymphangitic inflammations ensue, which render the course of eczema so tiresome and its treatment difficult.

The first indication is, in the case of any existing eczema, to inquire carefully into its original character, the one form before infection and the infectious form prior to its further progress, and the tissue disturbances which favour its advance. We need often to search for a long time ere we discover the actual cause of the constant recurrence of the cutaneous inflammation, attributed to a something in the constitution or the blood. For instance, it may be turpentine employed to cleanse brushes by artists, or for other purifying purposes. Lysol or lysoform may be mentioned, which, from their recognised efficacy, have gained a great reputation, yet are not borne well by all skins. Other causes are mouth-washes, as odol, or hair dyes. From such may arise ring-shaped erythemata round the mouth, or bands of infiltration on the forehead and temples. By disuse of such articles of daily employment, by the discovery of concealed external irritants, a spontaneous cure frequently results. Aggravation of numerous cases is owing to the patient attempting to treat himself, all the more apt to happen since dermato-therapeutics have passed for the most part into the hands of specialists. The main indication for special treatment is to preserve the irritated parts from further harm. If the dermatitis is recent—one almost always induced by some external irritant—it is necessary carefully to purify the surface. This is carried out in a warm bath with the addition of bran and a bland, never a medicated, soap, or by fomenting with infusion of camomile flowers, which has the advantage of being both aseptic and antiseptic after a mild fashion. Then the affected parts are to be enveloped for half an hour, three times a day, in compresses moistened with a 1 in 1000 watery solution of sulphate of zinc. The compresses are to be replaced by fresh ones, so soon as they become warm, which for convenience can be laid out on flat plates. This alternation of evaporating fomentation and cooling contraction imitates the natural activity of the absorbing capillaries, and is grateful to the patient. Directly on the moist follows the dry treatment, which consists in the free application of a simple dusting-powder, the cheapest and most serviceable being a fine pure talc, which, from its unctuousness, serves the desired object of absorption and protection by far the best. If itching is a prominent feature, then 1 to 2 per cent. of carbolic acid; if burning, from ½ to 1 per cent. of menthol may be added. Iodoform, orthoform, and bismuth are alike inadmissible. In this way the exudation, if present, can no longer serve as a nutritive medium for bacteria; their deposition is prevented. So by the establishment of a protective layer, frequently renewed and kept in position by bandages, the damaged, and for the time permeable, epidermis is replaced, till again regenerated. This procedure in time renders the skin dry. Its smoothness can be restored, if a paste composed of oxide of zinc 60, olive oil 40 parts be thickly smeared on, dusted over with talc on the trunk, covered with cotton-wool and a light bandage on the limbs. In the morning the face is best cleansed with olive oil. By such simple measures fresh irritation is avoided. The means themselves cannot irritate, while they obviate infection by the medium of the bacterially contaminated nails, or by rubbing or scraping so prejudicial to healing. Should superficial pustulation occur, each follicular pustule should be opened with a fine aseptic knife, compresses moistened with acetate of alumina are to be applied, and, later, the author's well-known vaseline starch paste. For the parasitic forms, if superficial, the same paste, with the addition of 10 to 20 per cent. of sulphur, is most efficient. When deeper infiltrations are present, success is hardly possible without tar. The crusted eczema of the face in children can be rapidly cured if managed as follows. It must be carefully cleansed, oiled over, then washed—without so much friction as to occasion bleeding; then thickly smeared with a salve of olei rusci, sulphuris sublimati, āā 15; vaselini, saponis domestici, āā 30; cretæ albæ, 10.—*M.*, powdered and bandaged. Finally the X-rays cautiously used are of great value.

TREATMENT OF MYCOSIS FUNGOIDES BY THE X-RAYS.

EVIDENCE accumulates of the remarkable curative influence which the X-rays exert on this hitherto intractable ailment, for which they were first employed in the Royal Infirmary, with success, two years since.

Lustgarten (*Journ. Cutan. Dis. inc. Syph.*, N. Y., 1904, April) relates an instance in a Russian by birth, who had suffered for five years. The lesions were scattered almost over the entire body, including the face and extremities. He had had about one hundred subcutaneous injections of arsenic, amounting in all to 40 grs., which improved the subjective sensations slightly, while the objective ones grew gradually worse. The itching was so intense that he could not work during the day nor rest at night. He had in all thirty-two X-ray exposures, totalling to over five hundred minutes. Practically, from the first exposure, the itching in the exposed parts ceased, coincidently with an evident flattening of the lesions. A mild dermatitis, of the first degree, developed on various parts of the body, terminating in a week with shedding of the epidermis, leaving a perfectly healthy surface. Lustgarten thinks that the production of this dermatitis affords the best chance against a recurrence, and up to the present no reappearance *in situ* has occurred where this has arisen. The patches have all disappeared except some still unrayed spots, he has gained in weight, feels perfectly well, and attends to business. Elliott also mentioned a case which he had seen during the last two years several times. Chaulmoogra oil, cacodylate of soda, and other preparations had been tried with little result. Seventy-two exposures had been given by Dr. Gwathmey, and the lesions had completely disappeared. The itching, which had been frightful, had very quickly ceased under the influence of the rays, and so far there had been no return. As regards X-ray burns, a combination of acetate and sulphate of aluminium afforded most relief.

DIETETIC TREATMENT IN SKIN DISEASES.

LASSAR (*Dermat. Ztschr.*, Berlin, 1904, March) points out that this is still in the initiatory stage. Both physicians and laity agree that there is a connection between the food partaken of and the existing cutaneous complaint. Yet, with but few exceptions—urticaria is one—the causal relation between the ingesta and the eruption is not an evident one. Still, in the handbooks and in practice, lists of prohibited viands are tabulated, and patients hanker after dietetic prescriptions. But we have not progressed so far in scientific knowledge as to admit of this being generally applied. Diseased changes in the skin may be evoked or favoured by certain substances, or the abandonment of particular articles; a qualitative diminution may lead to a modification of the morbid condition when present. Rules for general treatment must be varied to suit individual cases. The sole feature common to skin diseases is their occurrence in a special organ, not directly associated with nutrition, rich in processes of cornification, and physiologically stable. And yet good health shows itself in the skin. We speak of a blooming countenance or of a wrinkled skin, or of its tenseness or looseness. The integument of the starving and cachectic is dull and sallow, that of the well-nourished is shining and smooth, and the same holds good as regards animals. Wide areas of the surface may be affected without interfering with the great functions of respiration, of excretion of nitrogen, or of digestive activity; or, conversely, these may be disturbed to a considerable extent without affecting the skin. Turning to some groups of diseases, in the management of the various forms of exudative erythema and of urticaria, apart from external measures for mitigation and purely symptomatic applications which existing conditions demand, it is necessary to establish regularity in digestion, and besides, so far as is required, to administer antidotes. One can never say whether the most trivial and apparently transitory forms of these will run their course without further consequences, or are but the commencements of a troublesome and protracted complaint. These cases must therefore be energetically dealt with. After the bowels have been thoroughly cleared out by purgatives, a mineral water cure must be undergone. This, to be effectual, should be persisted in for weeks, and perhaps for months. If a spa can be visited, Carlsbad is the best, and next in order come Kissingen, Homburg, and Tarasp. Most persons spend too short a time at such spas. But the same treatment can be carried out very satisfactorily at home. A prolonged use of Mühlbrunnen or Rakoczy is often quite effectual. But the imbibition of the water must not be prematurely intermitted, due regard being paid to the maintenance of the strength and weight, and not too great stress laid on the failures to relieve and the relapses, in the earlier days of treatment. The salicylic preparations give important assistance, and their value tends to support the view entertained of the connection of erythema with rheumatic and gastric disorders. Under their use the erythemata grow pale, the wheals disappear. They seem to attack the morbid process after the fashion of an antitoxin, which paralyses the harmful material in the circulation. Similar considerations guide us in the treatment of prurigo. Though every lichen urticatus does not end in prurigo, still in almost all cases of the latter there is an initiatory stage in which wheals appear. Many instances of infantile eczema owe their origin to the kind of milk provided. More eczemas start from prurigo than is commonly supposed. We can often inculpate a too voluminous filling of the stomach and intestines with milk overmuch diluted with water, the too early administration of solid food, later on too many potatoes, or too much bread. Thus children affected with prurigo are often pot-bellied. Little children in such circumstances should have mild anti-fermentative purgatives, the best being the compound liquorice powder, enough being given to produce a sufficient and regular daily evacuation. Acne vulgaris, again, is a complication of two factors. There is a seborrhœic catarrh of the follicles, accompanied by retention, while by manipulations, particularly by squeezing, purulent infection arises. Excessive quantities of sugar and of sweets generally must be prohibited. The advantageous influence of yeast is evident in all forms of acne. It does not counteract the seborrhœa, but specially controls the development of acne pustules, the most likely theory being that the zymose directly destroys the pyogenic organisms. The reason why persons affected with glycosuria suffer so much from furunculosis is due to the abundant presence of sugar in the tissues. In all cases of chronic furunculosis, not only should an excess of sugar be avoided but a state of sugar hunger be favoured. Experience proves the correctness of this. So soon as all sugar-containing or forming substances are erased from the diet of those affected with acne or furunculosis, improvement is apparent.

DISEASES OF CHILDREN.

UNDER THE CHARGE OF

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PRECOCIOUS DEMENTIA IN CHILDREN.

IN an article on this subject in the *N. Y. Med. Journ.*, 1904, April 30, Mettler considers that heredity as a causative factor plays a significant rôle. It partakes more especially of a neuropathic taint. The exciting causes are usually psychic, traumatic, and mental strain. Unlike the idiots and imbeciles, the precocious dements do not so uniformly reveal physical stigmata, a fact which often assists in making a diagnosis. Prenatal injuries and fœtal troubles of a more or less gross character are generally to be traced in these cases. They are usually to be referred to as cases of moral insanity, or as the insanity of puberty. At birth the infants are apparently normal, and for a few years they appear to lead the life of healthy children. Ere long, however, they begin to manifest a marked degree of precocity. They are the brilliant and therefore the pampered ones of the family circle, and soon begin to tyrannise over or live solitary from their playmates. They are great readers, and are often regarded as intellectual wonders. They are sensitive and egotistical, and become moody and unsocial. Not infrequently they show marked talent, almost genius, for music, versification, or drawing, but they are not inventive.

They are eccentric, impulsive, and wayward; highly emotional; but are not industrious or systematic, and have little staying force. Their enthusiasms are intense, but temporary and flighty, and at times they are whimsical and silly. Sexually, they develop early, and manifest all the good and bad symptoms of premature love. At times they are really shrewd and keen-witted, and this, added to their selfishness, fosters lying, cheating, stealing, and other forms of deception. They are often cruel, and at times seem to be absolutely devoid of all moral attributes, and are frequently decidedly immoral. They are given to sudden impulses, and sometimes perform acts of violence of the most heartless sort. These impulses frequently pass into acute mania, with persistent and impulsive ideas, like kleptomania, nymphomania, and other obsessions. As they are often on the borderland of insanity, it is frequently difficult to decide whether to send them to a penal institution or to an asylum. When they approach puberty, or when some mental strain falls on them, they soon develop a condition of dementia which gradually deepens, until in the course of a few years death puts an end to it. Early in the period of dementia there are alternations of melancholia with mania and delirium, while stupor and indifference usually appear towards the end. The prognosis of precocious dementia is, generally speaking, bad, for it is a congenital degenerative affection.

The subjects are always dangerous and troublesome. The only treatment is prophylactic. This is primarily nutritive and disciplinary. In some cases, when sufficiently early started, such treatment may check the progress of the disease, and transform the individual into a useful or at least a safe member of society.

The supreme duty of the practitioner with regard to these cases is to recognise them early, so that proper measures may be suggested to the parents concerning nourishment, discipline, and education. Later on the majority of the subjects should be sent to an asylum, both for their own good and the good of society.

PYO-PERICARDITIS IN CHILDREN.

AT the March meeting of the Philadelphia Pediatric Society, Drs. Miller and Gittings reported a case of pyo-pericarditis in an infant of 4½ months, secondary to an attack of ileo-colitis. The child, after suffering for three months from bloody and mucous stools and elevation of temperature, succumbed at last through exhaustion. The disease of the pericardium was not suspected during life, the gradually increasing feebleness of the heart sounds detected on examination of the heart being attributed to the marked asthenia. At the autopsy a purulent pericarditis was discovered.

The authors point out the secondary nature of purulent pericarditis in children, and they emphasize its comparative frequency, especially in infants and in very young children. After the fifth or sixth year the etiological influence of rheumatism comes into play, and the effusion is generally serous. Statistics show that pus is found in from 1 to 3 per cent. of autopsies in children's hospitals. The most common cause is empyema, especially left-sided, either alone or accompanying pneumonia, and a variety of other affections, particularly pyæmia-producing processes. The bacteria usually present in suppurative pericarditis are those of the primary affection, although the pneumococcus is by far the most frequent. The authors point out the infrequency with which the condition is recognised during life, because of the indefinite symptoms, the frequent absence of friction, cardiac enlargement, and the other signs by which this affection is diagnosed in the adult. The reasons for failure in diagnosis are chiefly the small amount of pus usually present, the absence of dilatation, and failure to keep in mind the possibility of its occurrence. The issue is generally fatal, and as the only hope lies in prompt drainage, frequent examinations of the heart should be made in all affections in which pericarditis may occur, so that prompt operative measures may be taken at the earliest possible period.—*Arch. Pediat.*, N. Y., 1904, May.

PATHOLOGY OF TUBERCULOUS PERITONITIS.

THE following is a brief summary of a paper by Dr. George Carpenter, published in the *Rep. Soc. Dis. in Children*, vol. iii.—(1) Tuberculous disease originates in some children in the intestines or abdominal lymph glands. Either of these structures, and less commonly the latter, may be involved. These lesions are mostly associated with peritonitis. (2) Cases that are strictly confined to the intestines, the mesenteric glands, and the peritoneum, are comparatively rare; to the peritoneum alone, or combined with tuberculous inflammation of the serous membranes, rarer still. (3) Implication of other organs in fatal cases of primary abdominal tuberculosis is not uncommon, and of all organs and structures the lungs appear to be most likely to be attacked. Invasion of the lungs in such cases probably occurs *viâ* the thoracic duct and pulmonary artery, the lungs acting as a filter. This is contrary to the experience of others, who consider that food tuberculosis may get well or spread but never leads to tuberculosis of the lungs. (4) Primary abdominal tuberculosis is sometimes associated with tuberculosis of other parts which are free from external entrances, *e.g.*, the brain, the meninges, the pericardium, the pleura, choroid, etc. (5) The majority of cases of ulcerating tuberculosis of the lungs contract tuberculous intestinal ulcers, tuberculous lymph nodes, or a combination of the two conditions. This mode of onset of abdominal tuberculosis is more common than the other. It is not so frequently associated with peritonitis. The clinical symptoms in such cases are either pulmonary or perhaps cerebral, and not often abdominal.

The Prognosis in Tuberculous Peritonitis.

The complications which may precede or arise from tuberculous peritonitis seriously affect the prognosis, and one or more of them will usually be found to be present in the fatal cases. (1) Tuberculous ulceration of the intestine. This may be small in extent, and not associated with any marked symptoms. When it is extensive, as indicated by intractable diarrhœa and the passage of blood and mucus, the prognosis is unfavourable. (2) If extensive caseation of the mesenteric glands or of tuberculous masses exists, recovery is delayed, fresh infection of the peritoneum is apt to occur, and the risk of abscess formation and rupture is constantly present. (3) Localised suppuration from infection through glands or the intestine is a complication which, if unrelieved by surgical treatment, is apt to retard recovery, and lead to still more serious complications. (4) Obstructive symptoms, from intestinal matting or the pressure of tuberculous growths, are as a rule not marked. If progressive and not relieved by surgical measures, the prognosis is bad. (5) When pulmonary tuberculosis exists, with definite physical signs, the prognosis is unfavourable. The prognosis is very bad when the following complications arise. (6) The rupture of a glandular or other abscess, or the perforation of an intestinal ulcer into the general peritoneal cavity. (7) The onset of tuberculous meningitis. (8) The occurrence of general miliary tuberculosis.—Sutherland, *Rep. Soc. Dis. of Children*, vol. iii.

REPORTS OF THE MEDICAL SOCIETIES.

EDINBURGH OBSTETRICAL SOCIETY.—*June* 8, 1904.—Dr. BREWIS, President, in the chair.

SPECIMENS were shown by the PRESIDENT, Dr. J. W. BALLANTYNE, and Professor KYNOCH.

COMMUNICATIONS.—Sir HALLIDAY CROOM read a paper on "Cæsarean Section for Eclampsia, with two Cases," which will appear in the next issue of this Journal.—Dr. BERRY HART read "Notes on a Case of Tubal Abortion."

EDINBURGH MEDICO-CHIRURGICAL SOCIETY, *June* 1, 1904.—Professor CHIENE, C.B., President, in the chair.—Dr. NORMAN WALKER showed —(1) Three cases of lupus complicated by epithelioma; (2) a case of psoriasis.—Mr. GEO. CHIENE showed—(1) A patient, after operation for rupture of the middle meningeal artery and laceration of the temporo-sphenoidal lobe; (2) an infant, after laparotomy for acute intussusception when 30 days old; (3) a child, after laparotomy for a second attack of acute intussusception. (Previously shown, after first operation, at a meeting of the Society in December 1902.)—Dr. ALLAN JAMIESON showed—(1) A case of keloid treated by X-rays; (2) a case of nævus pilosus.—Dr. JOHN STEVENS showed a case of infantile paralysis of unusual interest.—Dr. E. BRAMWELL showed a case of Klumpke's paralysis-lesion of the eighth cervical and first dorsal nerve roots.—Mr. COTTERILL showed a patient showing the result of operation for lipoma nasi.—Dr. GIBSON showed a case of so-called hypertrophic pulmonary osteo-arthropathy.—Mr. SCOT SKIRVING, Mr. COTTERILL, and Dr. GIBSON showed card specimens.—Dr. DAVID WATERSTON read a paper on "Some Points in the Anatomy of the Pelvic Fascia in the Male in relation to the Surgery of that Region." He had been led to investigate afresh the anatomy of the perineum, owing to the difference of opinion among surgeons as to the best method of removing the prostate. He showed several photographs of formalin preparations, which demonstrated that the superficial layer of the triangular ligament was not intimately related to the urethra, but was attached round the margin of the bulb. This has an important bearing on the course taken by extravasated urine when the membranous urethra is torn. Dr. Waterston next considered the arrangement of the muscles of the perineum, and drew special attention to the thick anterior part of the levator ani. It was also shown that the so-called capsule of the prostate was really a laminated muscular outer coat, outside of which is the prostatic plexus of veins; and outside this, a reflection of the pelvic fascia which may be termed the sheath of the prostate. The prostate can be shelled out of its capsule, leaving the urethra intact and surrounded by a layer of prostatic tissue. The paper was illustrated by a lantern demonstration and microscopic and other specimens.—Mr. ALEXIS THOMSON read a paper on "The Anatomy of the Enlarged Prostate, so far as it bears on the Operation of Prostatectomy," which will appear in a future number of the Journal.

ANALYTICAL REPORTS.

FERROLEUM.

(86 Clerkenwell Road, London, E.C.)

THIS preparation has been in use in Canada for the past nine years, and is held there in high repute. It is an extremely palatable preparation, the taste of the cod-liver oil having been successfully masked. It contains, in addition to cod-liver oil, in the form of a fine emulsion, phosphate of iron and a small quantity of free phosphorus. As shown by the analytical report, its composition is as under:—

Phosphate of iron o.c.	1·43 per cent.
Phosphorus	A trace.
Cod-liver oil	40 per cent.
Glycerin	10·76 ,,
Moisture	47·81 ,,

We have given ferroleum an extended trial during several months in a variety of cases, and have found it extremely satisfactory. The patients put on flesh, and regained colour and vigour in a remarkably short space of time. In one case of extreme debility and anæmia, following on repeated attacks of acute rheumatism, the effect was most striking, the patient being restored to perfect health. In a case of fibroid phthisis, with a considerable degree of anæmia, there was a marked improvement under ferroleum. He had taken various preparations of cod-liver oil and petroleum emulsion without experiencing any benefit, but after six weeks on ferroleum he put on nearly 5 lb., his colour manifestly improved, and he slept much better than before. Such a result after so short a period speaks volumes for the beneficial effects of this preparation, which we feel assured has come to stay. Patients take it readily, and complain of none of the unpleasant after-effects which are so often experienced when cod-liver oil and iron preparations are administered. One patient, indeed, described the taste as rather like that of apples! Ferroleum only requires to be better known to be widely used, and the rigorous and fickle climate of the mother country will assuredly provide a more abundant supply of cases suitable for its exhibition than the admittedly more healthy climate of Canada.

EDINBURGH MEDICAL JOURNAL.

EDITORIAL.

Science and Protection.

A CASUAL inspection of the lists of those *débutantes* who have had the honour of being presented at recent Drawing-rooms, reveals the interesting fact that no less than three names connote the idea of very well-advertised nostrums. One is that of an emulsified hydrocarbon; another that of a fructiferous saline; while a third connotes the ideas of maternal tenderness and of a saccharine fluid of soothing properties. To the young ladies who bear these honoured names we cheerfully tender our best congratulations. Fate has favoured them, and called them to high position, which no doubt they will ere long adorn. The question must, however, suggest itself as to how many workers in science can hope to place their daughters in a similar exalted position. And the answer is obvious. The proprietor of a quack remedy, if he knows his business, is practically certain of wealth. The brilliant man of science must be content with cultured penury. He generates the discovery; the enterprising tradesman reaps the result, usually in dollars. That there is here an element of injustice appears evident. The remedy is not far to seek, but is one which will be sternly and indignantly refused. It is, to permit Protection in Science, by the taking out of letters-patent for discovery. That there is a deep-rooted, and on the whole a noble scorn for such a course redounds to the credit more of the heart than of the head of medical mankind. It was that which prevented Syme from taking out a patent for the discovery which he made, and which will ever be associated with the name of Macintosh. Had Syme accepted the vast fortune which such a procedure would have given him, what a powerful weapon for research he might have placed in the hands of his Alma Mater. But instead of this the discovery was left alone until a man, untrammelled with our code of honour, made it over again, and this great opportunity was lost.

Yet, if one thinks of it, the position is an illogical one. We are a close corporation, a strictly protected body, and in so far we accept, and live by, the protective idea. To be logical, we should either carry on the protective principle to the extent indicated, or plump for Free Trade in Medicine. It is nearly fifty years now since dear old "Rab" urged, in these columns, that same idea. But his was the proverbial Voice crying in the wilderness, and though the air was then full of Free Trade voices, none but he were bold enough to advocate it for Medicine. That time is now long gone by, and the air is filled with other voices, who sing the praises of Protection. But the cult of Medicine is largely idealist, could not in fact exist without that leaven, and the idealist objects at once, on behalf of humanity. "The money you would make," he says, "would be wrung from suffering fellow-creatures," and if he be blessed with a sense of humour, he indulges in pleasantries on the possibilities of improved patent processes for dealing with perforated appendices, and so forth. The other side of the question does not appeal to him, but there are two economic tendencies bearing on this question which should not be lost sight of. One is that a patented object has a hold on the market, which an unpatented rival never obtains. We know of one very excellent grate, for instance, which its inventor has never patented, hoping to popularise it, and the trade has neglected it entirely. Why this should be is not easy to explain, but the fact is there.

The other point is, that research would be greatly stimulated, were it likely that not only fame but wealth were to be the result of success. In this we should only be following the lead of Germany, where the custom of taking out patents for chemical discoveries is quite common. Many reasons are being assigned for the great preponderance of German discovery. May not this be one?

Science Work and Insurance.

CASES of dispute between policyholders and insurance companies in this country are happily of rare occurrence, compared with the vast number of transactions in which the companies engage, and the fact may be accepted as a tribute to the broad and generous view of their responsibilities to the public which the offices generally adopt.

To protect themselves against the unscrupulous, as well as to define their risks for the purpose of calculating the premium to be charged, it is clear that certain regulations must be laid down, and certain standards set up.

But the disputed claim of Dr. John Eyre against the Scottish Accident, Life, and Fidelity Insurance Company, which has recently obtained some notice, is one of those incidents unfortunate alike for both claimant and company, and we make no apology for briefly referring to it.

Dr. Eyre's contract provided, *inter alia*, that he should receive a fixed weekly compensation, in the event of his being disabled by septicæmia, which in the policy was further interpreted as "blood poisoning." Dr. Eyre in the course of his professional duties contracted Malta fever, through applying his mouth to one end of a pipette containing an emulsion of the *Micrococcus melitensis*, and, believing that he had a sufficient claim upon the company, sent to it the necessary intimation of disablement. The claim was disallowed, on the ground that Malta fever was not covered by the policy, and as Dr. Eyre persisted in his claim, the dispute was referred to arbitration. In the end the decision was given against the claimant, and not only was he thus obliged to forfeit the compensation to which he had considered himself entitled, but he was also saddled with the expenses of the arbitration, which it is understood amounted to about £140.

The medical evidence appeared to establish that the fever had been contracted through some slight lesion in Dr. Eyre's lip. The witnesses called for the claimant were both confident and unanimous in their testimony. They were all men of high standing and reputation. In a letter written by the secretary of the company, and dated 26th August 1903, it was admitted that if "the germ had got entrance through some accidental abrasion or puncture of the skin," the claim would be quite in order. When, however, this was established later, by the medical evidence referred to, the company fell back upon the classification of septicæmia prepared by the Royal College of Physicians in 1892, from which Malta fever was excluded, and on this ground succeeded in defeating the claim.

If blood poisoning is claimed by accident offices to be provided for under their policies, then any narrow interpretation, such as has been placed upon the policy in this instance, can by no possibility be justified. The exclusion of death or disablement resulting from "poison self-administered," when this is wilful, is reasonable enough, for intentional self-injury or suicide cannot be legitimately held to fall under the definition of an accidental occurrence. But the case under consideration was apparently one of accidental infection purely, and the claim was barred by a technical objection alone.

One would think it a pity, from the point of view of the company's own highest interest, that in this instance its action was not more generous; and it will certainly be the duty of every one seeking insurance of this character in future, to ascertain beforehand exactly what sort of contract he is entering into.

Social Diseases and Marriage.

OF all the numerous and varied obligations which devolve on the medical attendant, there are perhaps none which are hedged round with so many thorny perplexities as that of a client affected with venereal disease who contemplates marriage. Almost as serious a situation is created when a patient, already married, contracts such disease. The utmost tact, combined with resolute firmness, is required to prevent serious harm, or to obviate much future domestic unhappiness. The difficulty arises in great measure from the responsibility resting on the physician or surgeon, to guard at all hazards the secret committed to him, when he became cognisant of the ailment for which he had been consulted. Even in the event of the other party to the proposed union being also his patient, he cannot warn her—he is restricted from divulging to her or to her relations the nature of the complaint from which her betrothed is suffering. He receives no assistance in this respect from the law, as he would were it smallpox or scarlet fever, although the results of communication are in many cases far more serious and wide-reaching. Venereal diseases are not as yet classed among those compulsorily registrable, nor even are they regarded as on a par with the tuberculous, which may be voluntarily so. It is considered shameful to hint at their existence in any society outside the purely medical, far more to refer to them distinctly. Fournier has dealt with the theme of syphilis and marriage with the hand of a master, but there are other ramifications not included in the scope of his work. Our attention has been specially drawn to this topic by the perusal of a work treating of the whole group of what may very well be termed "Social Diseases" in relation to the marriage tie, by a well-known American physician,[1] in which the question in all its bearings is discussed and reasoned out more fully than in any existing memoir. The subject is one well worth the serious consideration of every practitioner of medicine, at his leisure, for the problem may be sprung on him at an unexpected moment, so that it is well for him if he has his mind made up as to the proper course to pursue. "From the many points at which they touch the relations between the sexes, social morality, and the welfare of society, they are pre-eminently *social diseases.*"

It is not by any means an old story, since gonorrhœa was regarded in most instances as a comparatively trivial ailment, one so common in the male sex as, in some circles at least, to be almost looked on as an everyday occurrence, and for the treatment of which the chemist's shop was far oftener resorted to than the surgeon's consulting-room. No doubt, various unpleasant sequelæ in men were recognised, and its persistence as a gleet, often for a prolonged period, was tacitly accepted. But for the woman it was scarcely held to be serious. The discovery of the gonococcus has materially altered opinion, and it is now universally conceded that, conveyed to the married woman, it constitutes a most formidable peril, which, while many times proving fatal, may, short of this, condemn her to lifelong ill-health and suffering, or may reduce her to permanent sterility, after the birth of a single child. The organism deposited in the cervix makes a further stride with menstruation, and, should pregnancy occur, it finds a congenial soil in the uterine lining after parturition, from whence to advance by the Fallopian tubes to the peritoneal sac. The impracticability of deciding with positive certainty whether a man is cured, and thus of sanctioning his entering into wedlock, introduces the element of dubiety into any opinion emitted by the attendant. Though the repeated warnings of gynæcologists have induced medical men, generally, to adopt a graver view of the situation than they were wont formerly to hold, it is not yet past dispute if sufficient care is even now taken that there are no lurking remnants of a gonorrhœa existing before permission is granted to marry. The issues are so momentous, that the utmost vigilance ought, in the interests of all parties concerned, to be exercised. Though the main force of the poison is exerted on the mother, for gonorrhœa is not hereditary, still her child does not in all cases escape, but may be rendered totally blind from ocular infection received during parturition or subsequently.

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[1] "Social Diseases and Marriage," by Prince A. Morrow, A.M., M.D., Emeritus Professor of Genito-Urinary Diseases in the University and Bellevue Hospital Medical College, New York. London: Sidney Appleton, 1904.

The evils of syphilis in its relation to marriage have been painted in strong colours by many hands, and its tendency to be transmitted to hosts of innocent victims, through a profusion of strange channels, have long been accepted by the profession. But the ignorance of the public is as great as our knowledge is precise. Fortunately, as a rule, we can cope with it more efficiently when it attacks females than we can in the case of gonorrhœa; still its persistence is indefinite, and one can never assert that it will not reappear at a later stage, to the detriment of some or other organ. Hence in syphilis there are three contingencies to be reckoned with: its influence on the mother herself, on her infant, and on the future health of her husband, should she marry, and in particular on his capacity as a bread-winner for the support of a family. The period of time which has elapsed since contraction of the disease has an important bearing on the first two, but other circumstances govern the third.

In the majority of instances, when the fact of the positive risk to which, by precipitate marriage, he would expose an innocent and confiding girl, is explained to the man, he is ready to postpone his wedding till such time as reasonable assurance can be given that the hazard is negligible. But there is always a small impenetrable residuum, who, in face of all arguments, insist on acting contrary to advice. The doctor places the terrible nature of the disease and its horrible consequences before his client's mental view, and pleads for delay—yet his contentions are set aside. Were it possible to be able to point out to him that, if he persists, he will become liable to punishment for wilfully communicating such a hurtful disease, this might cause him to waver and withdraw. It is indeed highly desirable that some such law should be passed. It is true it might not often be put in action. There are so many inducements to lead a loving wife to shrink from sheltering herself under it; but the very fact of its existence, and the possibility of its being resorted to, would have a deterrent effect.

After all, the main lever to be worked is how best to lessen the vast amount of venereal disease. No death statistics give us any clue to this, as other terms are substituted in the certificates. The source is prostitution. We cannot hope to eradicate this evil, but its regulation might be accomplished, and its unfortunate votaries so treated as to minimise its dangers. Were the diseases perpetuated by prostitution limited in their incidence to those associating with lewd women, there might be some faint excuse for those who refuse to legalise it. But surely protection ought to be extended to those guiltless ones who, through no fault of their own, and relying on the sanctity of marriage, become infected. Especially it is most desirable that the young of the male sex should be fully warned of the jeopardy to health, to personal appearance, to moral tone, and the attainment of high character, following on impure connections.

France and the Phallic Cult.

ONE of the most interesting Medical Journals appearing at the present day is one called *La France Medicale*, which appears twice a month, and is devoted to the study of Medical History.

In the No. 4, 19th June last, there is an interesting communication concerning continuance of the phallic cult in certain parts of France, or at least about the existence of certain customs, religious or traditional, which may be considered to be a modification of this cult, so zealously carried out in the old Roman days, and of which there are so many evidences still extant in Pompeii.

In the hamlet of Genetay, not far from Rouen, instances of pilgrimage to a certain farm, which had at one time belonged to the Knight Templars, where there were two specially venerated images, continued up to the beginning of the nineteenth century. The author is not quite sure whether the pilgrimage to this shrine or the following saturnalia did the pilgrims most good.

ORIGINAL COMMUNICATIONS.

TUBERCULOSIS OF THE FEMALE GENITALIA: A BRIEF RÉSUMÉ OF OUR PRESENT KNOWLEDGE.[1]

By H. MACNAUGHTON JONES, M.D., *London.*

(PLATES II., III.)

ONLY recently has there been any systematic differentiation of the etiology, symptomatology, and treatment of tuberculosis of the different portions of the female genitalia. A brief and practical synopsis of our present knowledge of this grave affection of the genitalia may prove of interest. Morgagni in 1744, through a post mortem examination, was the first authority to draw attention to genital tuberculosis in the case of a patient who died of tuberculous peritonitis. In the early part of the nineteenth century (1831), Senn and Raynaud, and later, Louis (1843) also recorded the presence of a tuberculous lesion in the genitalia. In the fifties, Thiry, Jeil, Paulsen, and Kiwisch; later on, Brouardel (1865), Cohnheim (1879), Verneuil (1883), and Hegar in 1886, all proved that tuberculosis of the genitalia was not such a rare affection as it had been previously thought.

FREQUENCY OF OCCURRENCE.—A. Martin said, in his report on the Rome Congress, in 1892: "The female genital organs share, much oftener than has hitherto been supposed, in the infection by the tubercle bacillus, which may begin and develop in any segment of the female genital apparatus." Murphy gives the following statistics bearing on the relative proportion of cases of tubercle of the genitalia in women who were tuberculous.

Nimias and Christoforis found one case in every twelve necropsies on tuberculous women; Schram found one case in thirty-four cases, Posner one in thirty-five, Mosler one in forty, Kiwisch one in forty, and Cornil one in every fifty to sixty cases.

Merletti, in 6000 necropsies at Parma, found that tuberculosis was the cause of death in 1360. In 205 of these the genitals were involved; in males thirty-four (2·41 per cent.), in females 172 (12·6 per cent.).

Hansemann (cited by Veit), however, in 7000 necropsies at the Friedrichshain Hospital, Berlin, found 450 cases of tuberculosis in women (6·5 per cent.). In only eighteen of these (4 per cent.) were the genitals involved.

Out of 1600 pieces of tissue from the gynæcological clinic at Greifswald, which were examined for tubercle bacilli, they were found in twenty-four (Martin).

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[1] I must specially acknowledge my indebtedness to J. B. Murphy of Chicago, and the comprehensive *résumé* of the entire subject embraced in his presidential address before the Chicago Surgical Society, October 13, 1903; also to Comyns Berkeley's paper in the *Journ. Obst. and Gynæc. Brit. Empire*, January, 1903. General peritoneal tuberculosis is not included in this summary.

F. Edge, quoting from Merletti,[1] gives the following statistics:—

Tuberculosis of the genitals is met with in 12·6 per cent. of tuberculous women, but in only 2·4 per cent. of tuberculous men. In tuberculous women, genital tuberculosis is met with in 22·8 per cent. during the child-bearing age, in 7·3 per cent. before puberty, and in 20·6 per cent. after the menopause. In 18·6 per cent. genital tuberculosis is primary.

Tuberculosis of the uterus was met with in seventy-five out of 172 cases in which the genitals were affected.

The *tubes* were the most favourable seat for the disease, and were affected in 157 out of the 172 cases of genital tuberculosis; tubal tuberculosis is generally bilateral.

ETIOLOGY.—These points are of special interest in the etiology and pathogeny of the disease.

HEREDITARY INFLUENCES.—Amann[2] considered that we must admit that genital tuberculosis in infants has a congenital origin, the glands being first affected, and through them the circulation, though later on affection comes from the air passages, or, more rarely, from the digestive canal and mesenteric glands, finding their way by erosion of the blood vessels into the circulation. Gottschalk regarded a case of tuberculosis of the adnexa as primary and hereditary, because three years after pan-hysterectomy was performed by the vagina no recurrence of the disease had occurred. The patient, æt. 32, was a virgo intacta. The tuberculous nature of the affection was proved by culture and inoculation. The father was tuberculous. No tuberculous lesions were found elsewhere. The tubes and ovaries were affected as well as the uterus.[3] Amann had a case in which tuberculosis of the genitalia was proved to have arisen through an affection of the bronchial glands, neither peritoneum nor intestine being affected.

SEX.—Amann also considered that the proportion of female subjects to male affected with tuberculosis was 20 per cent. of the former to 3 per cent. of the latter. Hyperplasia, chronic inflammatory changes, and the puerperal state increased the disposition to the affection.

COITION.—Both Verneuil and Cohnheim regarded coition as a probable starting-point in some cases of the infection. Fernet traced in two well-verified instances the tuberculous condition to coitus, and different authorities have shown the presence of the bacillus in the semen of tuberculous men. Murphy reports a case in which direct transmission by coitus also occurred, though he has seen so many cases of tuberculosis of the epididymis with tubercle bacilli in the urine and seminal discharge in married men without the wife becoming affected, that he concludes that other conditions are necessary for the development of tuberculosis in the female genital tract. On the other hand, should tuberculosis of the cervix extend to the vagina, and not involve the Fallopian tubes or ovaries, such limitation of the infection, Emanuel considers, shows that the disease has been primarily conveyed during coitus. The finger may convey the disease, so may the sound or other instrument. The important clinical and prophylactic bearing on this latter fact is obvious. At least, we are justified in the conclusion that intercourse with a consumptive husband is fraught with danger to the wife. The possibility of his being a cause of direct infection to her can be pressed with emphasis in those sad cases where infatuation and affection, despite remonstrance, still prompt rash determination to marriage, or husband and wife to occupy the same bed.

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[1] *Arch. di ostet. e ginec.*, Napoli, 1901, summary in *Brit. Gynæc. Journ.*, London.

[2] Fourth International Congress of Obstetrics and Gynæcology, Rome, Lucina, October, 1902.

[3] *Arch. f. Gynaek.*, Berlin, Bd. lxx., S. 74.

The blood as a vehicle of infection.—Veit also considers that the genesis of tuberculosis is from above, and rarely from below; that it may occur from infection from the blood, as well as through the lymphatics.

According to Kleinhans, there are three arguments in favour of infection by means of the blood current:—(1) The existence of tuberculosis in the genitals following tuberculosis of the lungs, with no intermediate foci. (2) The frequent localisation of tuberculosis on the site of the placental attachment. (3) The transmissibility of the bacilli from the mother to the fœtus.

To these Veit adds the sudden eruption of acute general miliary tuberculosis, which has been many times noticed to succeed the existence of a markedly circumscribed focus.

Schöttlander, having injured the fimbriated edges of the Fallopian tube in rabbits, injected the tubercle bacilli into the circulation, and found that the abdominal end of the wound became infected. He concludes that conveyance of the tuberculosis through the blood is common, more so than that through the uterus; and Amann, having regard to the comparatively poor supply of the parts between the uterine artery below and the ovarian artery above, considers that this relatively poorer supply of blood to this area may have an etiological significance in the presence of tubercle here.

Infection through the peritoneum.—In considering the causation of genital tuberculosis, the experiments of Pinner have a special significance. He showed that fine portions of cinnabar or lampblack introduced into the peritoneal cavity traversed the tubes, and found their way through the uterus and into the vagina. This would explain certain cases of infection; but, on the other hand, it has to be remembered that while the peritoneum is untouched the genitalia are frequently affected, and *vice versâ*. Of this, however, there can be no doubt—when the Fallopian tubes are affected the peritoneum and bowel are frequently also tuberculous. All observations on tubal tuberculosis go to prove this correlation.

From Murphy's experiments on monkeys, it is clear that the infection does travel from the peritoneum to the sub-peritoneal glands. Murphy's experiment showed "that the tuberculous process may extend deep into the muscular layer of the uterus into the body of the muscle coat from the peritoneal side, but it does not completely traverse the muscle coat. This would indicate that it is possible that the uterine mucosa might become infected from the peritoneum by direct transmission through the uterine wall." He was unable to find any report of a post-mortem showing this condition in the human female, nor was a case reported in which a primary tuberculosis of the uterine mucosa penetrated the muscularis in the peritoneum. So that he considers it fair to assume "that this is at least not a frequent route of transmission, either from the peritoneum to the mucosa, or *vice versâ*."

TESTICULAR CONTACT AND SEMINAL INFECTION.—Cases of tuberculous infection arising from the contagion of testicular tuberculosis have been recorded by Pfannenstiel and Prochownik, and various experiments have been performed to test the relationship between general tuberculosis and tubercle of the genitalia by Landouzy, Maffucci, Gaertner, Spano, Peraire, Popoff, and others.[1] From such experiments it seems clear that semen taken from a tuberculous patient, and injected into the peritoneal cavity, will cause tuberculosis; that tuberculous cultures injected into the saphenous vein of animals infected the testes; that bacilli may be transmitted from parent to fœtus through inoculation of the testes; that injections of tuberculous culture into the vagina of animals will cause infection of the uterus. Popoff, however, from the result of his experiments, concluded that there must be a preceding trauma in order to affect the genitals, and that tuberculosis following traumatism remains localised in the genital apparatus and its lymph glands.

INFECTION FROM WITHOUT.—Extensive experiments by Marie Gorovitz have confirmed those conclusions, and have shown that tuberculosis may reach the vagina and the iliac or lumbar glands from the uterus, and may directly invade the lumbar glands, as well as the peritoneum. It is noteworthy that *gonorrhœal* abrasions, the traumatisms of the puerperal state, and operative procedures have been shown to lead to tuberculous infection. Even *catheterism* of the uterus has been reported by Dührssen to lead to infection of the tube and peritoneum. The same consequence has followed on *operations on tuberculous cystomata.* This author has also reported infection following the *injection of milk* from a tuberculous cow.

RELATIVE FREQUENCY OF INFECTION.—Statistics prove that the order of frequency with which the different organs are affected is —*Fallopian tubes, body of uterus, ovaries, cervix uteri, vagina, and vulva.* Comyns Berkeley,[1] from an examination of the post mortem records of the Brompton Hospital for Consumption, from 1880 to 1902, during which period the genitalia had been carefully examined, states that in 798 autopsies performed on females who died of tuberculosis, in 62 (7·7 per cent.) the genitalia were affected, and the order in which this occurred was—Fallopian tube, 80·6 per cent.; body of uterus, 29·0 per cent.; ovaries, 22·5; cervix, 6·4; vagina, 6·4; vulva, 0.

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[1] Murphy, *loc. cit.*

Ehrenfest, quoting Kundrat and Penrose,[2] concludes that tuberculosis is present in from 8 to 18 per cent. in all cases of inflammatory disease of the uterine appendages.

TUBERCULOSIS OF THE GENITALIA IN CHILDREN.—*Age.*—Already attention has been drawn to the presence of tuberculosis in children, and the importance of rectal exploration, as urged by Carpenter, in the examination of the adnexa. Demme has reported cases aged respectively 7 and 13 months. "Children," Murphy states, "have a primary tuberculosis manifested only in the external genitalia." Schenk has reported a case of ulceration of the external genitalia in a child æt. 4½. The child had had tuberculous playmates, and he surmises that the infection was conveyed by the fingers. Karajan reports vulvar tumours in a child 2 years of age.

Murphy quotes Maas, who draws special attention to the comparative rarity of tubal tuberculosis in children as compared with adults. He could find but eight cases in medical literature of very young children in whom tuberculosis of the tube was present.

Howard Kelly has reported several cases of tuberculosis in children at different ages.

George Carpenter, of the Evelina Hospital for Children, who has had exceptional opportunities for the examination of the female genitalia in children, writes thus:—

> "My records of tuberculous disease of the female genitalia have been gained by the use of combined rectal and bi-manual examinations during life, and also in the post-mortem room.
>
> "(*a*) In a child, æt. 9 years, the Fallopian tubes were enlarged and caseous. Tuberculous extension had taken place from the peritoneum, and they had been invaded at their fimbriated extremities.
>
> "(*b*) In a girl, æt. 4 years, the ovaries were matted to the Fallopian tube, the extremities of which showed cavities filled with caseating material; she had tuberculous intestinal ulceration, together with tuberculous brain tumours, but no peritonitis.
>
> "(*c*) In a girl, æt. 7 years, was found an enlarged uterus, the right

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[1] *Journ. Obstet. and Gyn. Brit. Emp.*, January, 1903.

[2] *Arch. f. Gynaek.*, Berlin, Bd. lxv. No. 1; "Text-book of Diseases of Women, 1901."

Fallopian being the diameter of a lead pencil; there was a tuberculous mass the size of a pigeon's egg just above the base of the sacrum.

"(*d*) A girl, æt. 7 years, who suffered from tuberculous ascites, had a rounded tumour, three inches in length, and the thickness of the index finger, attached to the fundus of the uterus. This tumour subsequently disappeared. She has grown into a healthy woman.

"(*e*) In a child, æt. 2 years and 2 months, there was considerable peritoneal thickening in the hypogastric region and its neighbourhood; the left ovary, which was found to be enlarged, was adherent to the thickened peritoneum. This child had tuberculous glands in the neck and an enlarged spleen.

"(*f*) In a child, æt. 2¼ years, there was a tuberculous mass involving the right lumbar, iliac, and the hypogastric regions. The left ovary and Fallopian tube were healthy, but the growth had invaded the tube and ovary on the corresponding side.

"(*g*) In a child, æt. 14 months, there was a hard lump occupying the umbilical and hypogastric regions, and the right ovary was connected with it.

"(*h*) In a girl, æt. 6 years, there was a tuberculous mass in the right inguinal, lumbar, hypogastric, and umbilical regions, together with typical omental thickening. The uterus was normal. Passing from it to the right was a curly tube, the size of the little finger, which, on being hooked down, an oval tumour was felt, which was an enlarged ovary. The left Fallopian tube was not so enlarged, and it did not curl; its corresponding ovary was not enlarged."

In three other cases recorded by Carpenter, æt. respectively 3 years, 14 months, and 1 year, the adnexa were also affected, and the characteristic "lumpishness"—the term he uses to express the appearance and the feel of tuberculous masses involving the adnexa—was present. He has had no experience, clinical or pathological, of *primary* tuberculous affection in children.

Diagnosis.—Speaking generally, the diagnosis of tubercle of the genitalia will depend upon (*a*) a careful local examination of the vulva, vagina, and portio vaginalis, assisted by a bi-manual examination of the uterus and adnexa under anæsthesia, (*b*) a microscopical and bacteriological examination of some portion of the affected tissues which are within reach and can be removed by either the knife, scissors, or curette; (*c*) a similar examination of the fragments removed after curettage of the uterine cavity; (*d*) the presence of tuberculosis in other organs of the body; (*e*) the physical characteristics of the surfaces affected, the appearances of the ulcerated parts, and of the tubercular ulcers, as to their colour and the nature of the granulations; (*f*) the duration of the disease, and the subjective symptoms which have accompanied it.

Sellheim considers that "certainty in the diagnosis depends upon local examination. Independent of the characteristic peculiarities to be met with in the exploration of the abdomen, much information may be gained by the recognition of tuberculosis of the pelvic peritoneum, which almost invariably accompanies similar disease of the genitals, and which, as pointed out by Hegar, may be detected on internal examination by nodules that are almost pathognomonic. These nodules are found chiefly upon the posterior surfaces of the ligamenta sacro-uterina, and frequently the tube has assumed the form of a rosary in which the nodules are of an extremely hard consistence. The presence of a nodule in the pars uterina is a reliable sign of tuberculous disease. Microscopical examination of the mucosa of the uterus is always necessary in case of tuberculosis affecting the tubes or the pelvic peritoneum, as, apart from its diagnostic importance, disease of the uterine mucosa may modify the prognosis and treatment. Using all these methods, Sellheim, dissenting from the opinions expressed elsewhere, considers that tuberculous disease of the female genital organs may, in most cases, be diagnosed."[1]

The diagnosis of tuberculosis of the vulva, vagina, uterus, and tubes is referred to under the different headings named.

DIFFERENTIATION FROM CARCINOMA.—Charles Ryall (Cancer Hospital) has furnished me with notes of three cases in which tuberculosis of the peritoneum and adnexa was mistaken for malignant disease. In one, the patient, æt. 35, presented all the appearances associated with advanced cancer, a tumour being quite fixed in the pelvis and incorporated with the uterus. Though regarded as incurable, she was kept under observation, and as the tumour became smaller an exploratory incision was made. This revealed extensive peritoneal tuberculosis, and a dermoid cyst of one ovary.

In another case, malignant disease of the adnexa was diagnosed. A nodular growth, adherent to the uterus, was found, which, on examination through the pouch of Douglas, appeared to be cystic. Operation revealed extensive peritoneal tuberculosis, a dermoid cyst of one ovary, and the pelvis full of caseous material. The age of this patient was 44.

In the third instance the woman was æt. 45. A nodular and irregular mass occupied the left fornix and Douglas's pouch. The growth was very hard and fixed. Exploration revealed extensive pelvic peritoneal tuberculosis, and a small papillomatous cyst of the left ovary.

In each of these cases the emaciation, the constitutional symptoms, and the physical characters of the growth favoured the idea of malignancy. In none, however, does there appear to have been any characteristic discharge, nor was the uterine cervix or canal affected, while the absence of pain and hæmorrhage should have made the diagnosis of malignancy at least doubtful. All three show the need for remembering the similarity in the constitutional effects of both affections. I have myself opened the abdomen under similar conditions, finding, not carcinoma, as I expected, but wide tubercular infections.[1]

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[1] *Brit. Gynaec. Journ.*, London, Nov., 1902.

THE VULVA.—There is somewhat of a conflict of opinion as to the rarity of tuberculosis of the vulva. Some cases of lupus have been reported. Matthews Duncan first described the condition which he termed "lupus of the vulva." This included chronic, painless, hypertrophic states of the vulva, without infection of the neighbouring glands, yet liable to various degrees of ulceration. Thin, from his pathological examination of some growths submitted to him by Matthews Duncan, supported this view, pointing out, however, that the microscopic appearances were quite different from those found in lupus vulgaris. There was small cell infiltration beneath the epithelium, and blood vessels ran straight to this part. Fibrous tissue was found in all stages of development.

Both Hutchinson and Malcolm Morris regarded these cases as having a syphilitic origin. I had one such typical case as described by Duncan. I could clearly trace a syphilitic history. Shaving away the growth, I applied Paquelin's cautery, and the part healed permanently. According to Berkeley, Whitridge Williams could only find records of three cases of true tubercle up to 1894, those of Deschamps, Chiari, and Zeigbaum,[2] one case only, that of Risck, having occurred since. In these instances the tubercle bacilli were found. The case of Kelly, in which, after excision of the diseased area, which included the greater part of the external genitals, he covered the parts by flaps taken from the vaginal wall, was not referred to by Berkeley. The patient was æt. 55, the vulva was ulcerated, the disease involved the vestibule and central portion. Some bacilli were discovered, and characteristic granulations, with scattered tubercles through the deeper tissues, were present. Altogether, Murphy quotes fifteen cases in which the vulva was affected, including, besides those mentioned, cases reported by Cayla, Viattel, Montgomery, Davidsohns, and Kuttner. The latter cured a little girl of six years who suffered from tubercular bronchial catarrh. There was induration of the right labium, with ulceration and small ulcers over the mons veneris and upper part of the left labium. The diseased structures were excised, and these and the tributary lymph glands showed typical tubercular lesions. All this, however, only proves that tubercular disease of the vulva is of extremely rare occurrence.

Esthiomene.—Murphy considers that the esthiomenic ulcer, lupus and rodent ulcer, should be included, but it is doubtful if the true esthiomene[1] (*ἐσθίω*, "to eat") and cases of rodent ulcer should be, at least in a large proportion of the instances in which they are met, regarded as of a tubercular character.

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[1] Wallart (*Zeits. bt. f. Geb. u. Gyn.*, Bd. i. Heft 2), noticing the sequence of uterine cancer to tuberculosis in certain cases, though the concurrence of the two diseases is extremely rare, believes that there is evidence to show that tuberculosis may be the predisposing factor in the causation of cancer.

[2] *Johns Hopkins Hosp. Rep.*, Baltimore, vol. iii., p. 85.

Characters.—Tuberculous ulcers of the vulva are usually shallow, of irregular shape, sometimes oval or round, extending slowly, having granular surfaces, the granulations being either semi-translucent or of a yellowish colour. The margins, though occasionally sharply defined, are often irregular and ragged. A crust occasionally covers the base of the ulcer. The ulceration may finally lead to destruction of parts of the labia and fourchette, and extend into the perineum. Under these circumstances the appearance of the ulceration is not unlike that of epithelioma or chancroid. Should there be proliferation of tissue, both nodules and polypi may be present (Murphy), and the clitoris enlarged so as to resemble that affected with elephantiasis. It is important to remember that the lymph glands are not involved for a long time, and, clinically, the very slow progress of the disease, added to careful microscopical and bacteriological examination of portions of tissue removed, will serve to confirm the diagnosis.

Poeverlein,[2] in a case which was diagnosed as sarcoma, removed from the inner surface of the right labium of a woman, æt. 49, a tumour the size of a five-shilling piece. There was no ulceration. Microscopical examination proved it to be tuberculous. It would appear to be the only case on record in which no ulceration was present.

Tuberculosis of the Vagina.—So far it appears that only one case of *primary* vaginal tuberculosis has been recorded (Murphy). Bierfreund found a tuberculous ulcer in the vagina, the only focus in the body. Therefore the tuberculous infection is conveyed either from above from the uterus, or from the vulva (very rare) from below. Giel found that in forty-five cases of tuberculous disease of the uterus the vagina was only affected in three. Springer collected statistics of cases occurring in the Frauenklinik in Prague during twelve years, and gave the source of the disease as arising twice from the blood, three times from the uterus, once from the Fallopian tube, and once from the intestine (Berkeley). The possibility of the urine being the channel of the infection is suggested by him. These sources of infection embrace all those given by Amann, with the exception of direct infection from without.

Varieties.—It may be of a miliary or ulcerative character. The ulcers are surrounded by a zone of infiltration, in the centre of which is the characteristic greyish ulcer with a rather clearly cut edge, at times filled with caseous matter, under which lie the grey or yellow granulations of which its base is composed. Extension of the ulceration may proceed in the direction of the rectum or the bladder. Under all circumstances the progress is very slow.

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[1] In a case of true esthiomenic ulcer under my care, both by culture and microscope I failed to detect evidence of tubercle, though the examination was repeatedly made.

[2] Hegar's *Beiträge*, Bd. viii. H. 1.

TUBERCLE OF THE PORTIO VAGINALIS.—*Frequency.*—The portio vaginalis is also a rare site of infection. Of 163 cases mentioned by Murphy (including twenty-seven necropsies of tuberculous women by Doran), there were only eight cases in which the cervix was affected. That it may appear here as a primary focus is clear from cases recorded by Agello, Michaelis, Emanuel, Williams, Matthews, Lewers, Driessen, Beyea, and others.

It is noteworthy that, as Fränkel has shown, tuberculosis may be present in the adnexa and cervix while the fundus remains free of the infection. On the other hand, the portio may be free while the Fallopian tubes are affected.

Varieties.—Murphy divides tubercle of the portio into ulcerative, papillary, miliary, and "bacillary-catarrhal." He asks, with A. Martin: "Is it the tenacious secretion of the cervical mucosa, or, as Vassmer believes, the thick epithelial layer here, which opposes the penetration of the bacilli?" It is curious also that negative results have followed searches for bacilli (Merletti) in the uterine secretion. Yet inoculation with these same fluids have proved tuberculosis to be present. This makes it clear that the inoculation test giving a positive proof of the presence of tuberculosis does not in itself establish the fact of the genitalia being affected, as the infection may come from the peritoneum.

In the *ulcerative* form we have single or multiple ulcers, deeper than erosions, and of varying size and extent. In the *papillary* tuberculosis we have proliferating fungous masses, underneath which are the beds of tuberculous granulations. A close resemblance to carcinoma may cause these to be confounded with this latter affection. In the *miliary* form there is the characteristic dissemination of miliary tubercles, scattered here and there throughout the stroma of the portio, and over the mucous surface. Ulceration may occur, but it is not certain. The *bacillary-catarrhal* variety is limited to the surface epithelium, and the glands, which latter may be filled with caseous material containing numerous bacilli (Schutte).

Microscopic appearances.—Murphy thus summarises the microscopical appearance of cervical tuberculosis:—

"As regards microscopic appearances, we find many variations in cervical tuberculosis, depending on the stage of the process and the form of the disease. Tuberculosis of the cervical mucosa manifests itself primarily by a proliferation and metaplasia of the surface and glandular epithelium. The gland lumen becomes occluded by division of the lining cells. In cases like the one of Alterthum, where the microscopic appearances closely resembled carcinoma, a large number of slides must be examined until the tuberculous nature is positively demonstrated. In the beginning of mild forms of cervical tuberculosis the infiltration of small cells may be limited. After the glandular lumen is obliterated by proliferation of the lining cells, the glands appear as solid columns. As the disease progresses the metaplastic cells show retrogressive changes, finally ending in necrosis and caseation. Giant cells are only occasionally encountered in the gland proper. According to Emanuel, the cervical glands and stroma may also hypertrophy in the tuberculous process, and resemble the section of an adenoma.

"As the degeneration of the epithelium progresses, granulations take its place, and the cervical mucosa is now covered with granulation tissue in which only glandular débris may be recognised. Giant cells and tubercles are now observed. More or less hypertrophy of the connective tissue is seen in nearly all forms, coexisting in the more chronic forms with areas of caseation and necrosis. In the papillary type the fungous growths are made up of granulations and new-formed connective tissue, in which are blood vessels, giant cells, and tubercles, in addition to diffuse epithelioid cell formations."

PRIMARY TUBERCULOSIS OF THE CERVIX.—Hauschka operated on a case in which there was a hard tumour, the size of a hazelnut, in the cervix, with prolongations into the canal. Vaginal pan-hysterectomy proved it to be primary tuberculosis of the cervix.[1]

TUBERCULOSIS IN THE FUNDUS UTERI.—"Merletti, in 172 cases of genital tuberculosis, found well-marked lesions of the uterus in seventy-five.

"Vassmer, reporting six cases of tuberculosis involving the uterus, in five of which diagnosis was established by the curette, states that they appeared at the clinic within ten months.

"Stolper, in thirty-four necropsies on tuberculous women, found uterine tuberculosis in three; and Wolff, in seventeen similar necropsies, found uterine tuberculosis in three also.

"Cullen, in eighteen months, diagnosed six cases from the clinic; and in Martin's clinic at Greifswald, where the mucosa is examined as a matter of routine, in some 1500 cases tuberculosis was found twenty-four times."

Symptomatology.—When any woman presents herself suffering from endometritis of a chronic nature, attended by a discharge which is more of the leucorrhœal than the ordinary and characteristic discharge of chronic endometritis, the possibility of tuberculous infection must be kept in mind. Should the leucorrhœa have resisted treatment, and after a temporary cure have again recurred, and there be any evidence of tuberculosis elsewhere in the body, this suspicion will be strengthened,—the more so if the character of the discharge changes and assumes somewhat of a caseous appearance. If a bi-manual examination be made under such circumstances, and the adnexa are found to be enlarged, and further, if there be signs of tuberculous peritonitis, our suspicions are verified, and careful examination of any discharge for bacilli should be made, or enough of tissue obtained by curetting for the same purpose, as thus alone can a certain diagnosis be arrived at, for no clinical symptoms differentiate tuberculous disease of the fundus uteri from other forms of disease in this situation.

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[1] *Wien. klin. Wchnschr.*, 1901, No. 51.

DIAGNOSIS OF TUBERCLE OF THE UTERUS.—The diagnosis of tuberculous disease of the cervix is by no means easy, so similar are the objective signs to other ulcerative conditions of the portio, and the discharges which accompany these. Whereas in carcinoma there is greater irregularity and depth in the affected surfaces, more frequent and profuse bleeding, greater fœtor and more pain, there is less sensitiveness to examination, and the rather typical granulation bed of tuberculosis is absent. In tuberculosis the surface is more regular and less ragged, bleeding is absent or less severe, fœtor is not so marked as in epithelioma (this possibly being due to the absence of hæmorrhage), and the progress of the disease is much more protracted than in carcinoma. But the only conclusive tests are the detection of the miliary tubercles and of the tubercle bacilli (Whitacre).

Associated with the advancing invasion of the muscular structures are the changes which precede it in the endometrium. There is cell proliferation in the glandular elements—"the cells assume a cuboidal shape, and the nucleus moves towards the centre"; the gland lumen is encroached on and obliterated. Coincident changes occur in the epithelium, which proliferates, and finally degenerates. Giant cells are occasionally present. Caseous material covers the endometrium, and gradually fills the cavity of the fundus, when the muscular structure gives way before ulceration and degenerative process. The caseous mass breaks down into pus, giving rise to the characteristic purulent discharge of this variety. Meanwhile the canal is occluded by the caseous material, and a hydrometra or pyometra may result. The frequency with which the uterus is infected from the tubes explains the common invasion of the cornea of the uterus.

RELATION TO MENSTRUATION AND PREGNANCY.—It is thought that menstruation changes offer an obstacle to the process of tuberculosis, as it is more frequently present in the uterine cavity before puberty and after the menopause. It appears that multipara are the more susceptible to the infective changes in the parturient and vascular supplies, such as rupture and thrombus, and consequent alterations in the vessels are believed to favour the tuberculosis process.

Amann and others confirm the view that it is rare for genital tuberculosis of the uterus to be transmitted from the peritoneum or bowel, or indeed from the lymphatics. The infection, in the majority of instances, descends from the tube into the uterus.

PRIMARY TUBERCULOSIS OF THE FUNDUS.[1]—The only authenticated case of primary tuberculosis of the fundus is one which Hauschka considered he was justified in classing as such, as after hysterectomy no evidence of tuberculosis elsewhere could be detected, though the endometrium and muscle were found to be tuberculous. Still, here the mucosa of the tubes was also involved, and it is possible that this may have been the primary seat of the disease.

Histology and varieties.—Pozzi divides tuberculosis of the uterus into these forms—acute miliary, interstitial, ulcerative.

The first, or *acute miliary tubercle*, is simply a sequence of the general infection of the entire system.

The *interstitial* is a rare and essentially chronic form, yet it may manifest itself through uterine accidents and injuries, the results of parturition.

The *ulcerative* type is the most frequent and the most important. In the early stage the diagnosis is most difficult, and the affection simulates chronic endometritis.

Stolper regards these as but different stages of the same pathological conditions, seeing that they are often to be found co-existing in the same uterus.

Paul Petit considers the following as the more characteristic histological appearances:—A diffusion of dying or atrophied cells; giant cells, in variable number; embryonic nodules detached from the stroma developed in the vicinity of the vessels, the lumen of which may or may not be preserved; numerous changed glands altered in shape, dilated, and with the epithelium lining them elongated or in a state of transformation. The possibility of some morbid process in the uterus having preceded the tuberculous infection has to be remembered. A. Martin has recorded one such case of carcinoma complicating the tuberculosis.

Schmorl, Lehmann, Birch-Hirschfeld, and others have shown that congenital tuberculosis may be due to passage of the tubercle bacilli through the placenta to the organs of the fœtus. The bacilli were found in three cases in the fœtal placenta.[2] In Anache's case,[3] where the infected mother died three days after labour, tuberculosis was present in the placenta, and in the case of her infant, who survived for twenty-six days, bacilli were found in the liver, spleen, lungs, and kidney. I have known several instances of exacerbation of all the symptoms of phthisis during pregnancy, and a rapid fatal prolapse after delivery.

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[1] There is an interesting specimen in the College of Surgeons Museum, figured by Robert Barnes, where the cavity of the fundus was filled with a tuberculous mass; the cervix was quite free of the disease, but the Fallopian tubes were affected. (See author's "Diseases of Women," 8th edition.)

[2] *Am. Surg. Bull.*, March 15, 1895.

[3] Murphy, *loc. cit.*

TUBERCULOSIS OF THE FALLOPIAN TUBES.—*Frequency.*—As has been already said, it is in this intermediate link of the genitalia between uterus and ovary that the disease is most frequently manifested. Murphy gives the results of 4586 necropsies made by Schramm, von Winckel, Donhoff, Frerichs, and von Rosthorn. In sixty-seven instances the tubes were tuberculous. In 814 cases of salpingitis reported by Martin, von Rosthorn, and Williams, the tubes were tuberculous in twenty-nine.

As to age, Mäas could find but eight cases of tuberculosis of the tubes recorded, including his own, that of a child æt. 5 years. The uterus here was also involved, and the ovaries and vagina were free. The infection appeared to have travelled from the umbilicus by the parietal peritoneum. In one of Kimdral's cases, no other focus being discoverable, the affection was regarded by him as primary; and in another, cancer of the cervix co-existed with the tuberculous disease in the tube.

"Why," asks Murphy, "does the tube become involved while all the intermediate portion of the genital tract, from the vulva to the fundus, escape?" He ascribes this immunity to the greater resisting power of these intervening structures.

Varieties.—Miliary, chronic diffuse, and chronic fibroid tubal tuberculosis have been described. Martin and von Rosthorn differentiate acute secondary and chronic primary tuberculosis of the tubes.

.In *miliary tuberculosis* miliary tubercles are scattered over and on the tubes, and more especially at the outer end, which may be infrequent, and resulting adhesions attaching the fimbriated end of the tube to the surrounding structure.

The tubal affection.—The following forms have been recognised:—(*a*) A tuberculous perisalpingitis, in which the serosa only is the seat of granulations; (*b*) a miliary parenchymatous salpingitis, in which the mucosa and musculosa are both affected; a tuberculous endosalpingitis, in which the mucosa alone is involved (rare, Williams).[1]

The epithelium of the tubal mucosa suffers with the evolution of the disease; the usual ending is caseous degeneration.

The conditions were well exemplified in the case of Cullingworth's, in which abdominal section was carried out for pelvic peritonitis, the patient at the time suffering from tubercle of the apex of the right lung.

The peritoneal surface of the uterus, Fallopian tubes, and adjacent coils of intestine were studded with miliary tubercles. The uterus was pushed forwards by a mass behind it, consisting of a small cystic ovary with the enlarged and thickened right tube curving round it, the whole so densely adherent that nearly an hour was occupied in the separation. The left tube was exceedingly tortuous, much thickened, and universally adherent, the adhesions being more recent than those on the right side. The left ovary contained a large cyst, but was not enlarged. It was entirely surrounded by adhesions, and its external covering was thickened and opaque.

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[1] Merletti, *Arch. di ostet. e ginec.*, Napoli.

On examining the parts removed, the portion of right tube was 3 in. long and 1¼ in. broad. The walls were like cartilage, and measured ⅛ to ¼ in. in thickness. The mucous membrane was much swollen. The free end of a tube was buried amongst the adhesions. The portion of this left tube measured, while still unstretched, 2½ in. It was twisted at its uterine end like a corkscrew. At the centre there was a dilated portion ¾ in. long, softer than the rest of the tube. The mucous membrane was deeply ulcerated, showing deep pits full of caseating tubercle.

In *chronic diffuse tuberculosis* the amount of enlargement and distention of the tube varies, and the sausage-shaped tumours are of varying size, while the fimbriated ends of the tube are closed, and adhesions frequently bind down the pyosalpinx posteriorly in Douglas's sac.[1]

Fibroid variety.—In the chronic fibroid varieties[2] the walls of the tubes are thickened by excessive development of fibrous tissue, and the fimbriated end of the tube is closed. It is essentially a chronic affection, and does not involve the same risks as the other forms, being in itself of a conservative nature.

Murphy thus summarises the pathological anatomy of the affection:—"The tubes, as a rule, are enlarged, moderately firm in consistency, and the serous covering is thickened. They may be covered with a false membrane, in which nodules may be noticed. The calibre usually enlarges towards the abdominal end (cornucopia shaped); the fimbriæ are swollen, and frequently have nodular thickenings. The abdominal opening may be patent, partly closed with a caseous plug protruding from it, or impermeable. In this latter event a pyosalpinx rapidly forms, which may reach enormous proportions (2 litres, Stehmann). If the fimbriated end be open,—which is often the case,—if its walls be infiltrated with a non-mixed infection, caseous débris is discharged into the peritoneal cavity. As the tube frequently contracts adhesions to the adjoining viscera, cavities may be formed into which these masses are emptied, or become encysted. Finally, by the adhesion of the false membranes to the tube and the viscera, everything is matted together into one mass."

NODULAR SALPINGITIS (TUBERCULOUS).—That the nodular condition of tube referred to under this name is not peculiar to any special form of salpingitis, is well known, as it is found in other forms of chronic salpingitis as well as in the tuberculous variety.

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[1] Howard Kelly has recorded some interesting cases of tubal tuberculosis with adhesions of the omentum to the tube, and general tuberculous peritonitis.

[2] *Johns Hopkins Hosp. Rep.*, Baltimore, vol. iii. p. 85; "Operative Gynecology," by Howard Kelly, vol. ii. pp. 136–148.

In many cases nodules are present in the pouch of Douglas, and on the broad ligament which can be felt through the vagina. Murphy gives the details of a case of tuberculous salpingitis in which the abdomen was opened ten months after the previous cœliotomy, and the peritoneum was then found to be quite free of any vestige of tuberculosis. This salutary consequence of removal of the focus of infection is verified by similar results in other cases.

Effect on Menstruation.—That menstruation may continue regular, even if both tubes be affected, so long as the uterus is healthy, is shown by Orthmann and Williams.

Case 1.—*Primary tubal tuberculosis—abdominal cœliotomy—subsequent curettage, followed by two pregnancies, one a twin labour.*—The tube was removed from a patient, æt. 22 (Plate II.). She had been married for two years and a half at the time of operation, and had completed her first pregnancy at the end of the first year of her married life. She was brought to me in January 1901, and complained of considerable and constant pain in the left side, with inability to walk and dyspareunia. The catamenia had been regular and normal. On examination, the adnexa on the left side were found much enlarged, softened, and very sensitive. The right were not enlarged, but were adherent. Immediate operation was advised. Operation was, however, declined.

I did not see the patient again until the July following. Pain had then been for some time agonising, and she herself now demanded operation. The right Fallopian tube was distended with pus, forming a long crescentic swelling 1½ in. in diameter at its widest part, the surface of the tube being adherent. The right ovary, though fixed by some adhesions, was healthy. A large perimetric cystoma had formed behind the meso-salpinx, between the distended tube, the ovary, and the adjacent viscera. The following is the conclusion of Mr. Targett's report:—

"The external surface of the specimen is covered with thin fibrous adhesions in which many miliary tubercles are embedded. The lumen of the tube is filled with thick caseous pus, and the inner surface is shaggy from ulceration of the mucous membrane. There is very little thickening of the wall of the tube anywhere, and in some parts it is much thinned by distension and ulceration. Microscopical sections of the undilated uterine end of the tube exhibit general thickening of the mucous membrane and infiltration with miliary tubercles. The epithelial lining is for the most part intact. There was some endometric discharge at the end of 1902. I curetted the uterus, but there was no evidence of tubercle.

"The patient was delivered in 1903 of twins, which are now (1904) quite healthy children, and she has been again delivered of a healthy child at full term."

Case 2.—*Primary tuberculosis of Fallopian tube with hæmato-*

salpinx.—The macroscopical and microscopical specimens were prepared for me by J. H. Targett, who has furnished me with the pathological report (Plate III.). The lady from whom the adnexa were removed first consulted me early in May of 1899. She then complained of pain in the right side, pain after passing water, and attendant irritation of the bladder. Previous treatment had been fruitless. She was 29 years of age; in other respects she had very good health, and was of a healthful appearance. The constant pain interfered with her happiness, and kept her more or less an invalid. Her catamenia were regular. The uterus, on examination, was found to be small; there was a tumour of the right adnexa, the left were normal. At the time palliative treatment was resolved upon, and she returned home. In June, being no better, and the pain still continuing, as also the bladder symptoms, salpingo-oöphorectomy was performed.

Report on tuberculous Fallopian tube.—"The outer half of the tube is considerably enlarged, and its lumen uniformly dilated. The abdominal ostium is closed by adhesions, but traces of the fimbriæ can be discerned on the exterior. The surface of the tube is generally free from adhesions, though there are a few fibrous threads on the ovary. A section across the dilated portion of the tube shows a marked thickening and rugosity of the mucous coat, as well as a finely granular appearance of the mucous surface. The lumen is filled with blood and retained secretion. Microscopical examination reveals an abundance of grey tubercles in the substance of the mucous membrane, the giant cell systems being well developed. The muscular coat is not yet invaded, though the tuberculous formation has advanced in that direction. The epithelial covering of the thickened rugæ is for the most part preserved. The adjacent ovary presents a recent corpus luteum, and its substance is healthy. There is a striking absence of any peritoneal lesion, and for this reason it is probable that the tuberculosis of the Fallopian tube is primary." I recently saw this patient. There was some metrorrhagia, but otherwise she was in excellent health.

Shober has reported a case of ectopic gestation associated with tuberculosis of the tubes.

TUBERCULOSIS OF THE OVARY.—Murphy groups 394 cases of genital tuberculosis reported by Speath, Merletti, and Orthmann. Of these, seventy-six had the ovary implicated. Of fifty-seven cases of absolute diagnosis by microscopic examination, collected by Orthmann, nine were tuberculous ovarian cysts, and forty-eight were tuberculous ovaries. Terrillon, in 1889, first recorded three undoubted cases of tubercle of the ovary.[1]

Primary tuberculous disease of the ovary is so rare, and the evidence so doubtful as to its occurrence, that for practical purposes it need not be taken into account. Gemmel brought before the North of England Obstetrical Society a case of primary tuberculosis of both ovaries, in a patient æt. 26. The fimbriated end of one tube was involved where it was adherent to the ovary. There was no evidence of any tubercle in any other organ of the body. In Max Madeleuer's case the opposite Fallopian tube contained caseous material, and there was an abscess on the posterior wall of the uterus, the patient dying of phthisis.[1] As a rule, the ovaries are infected either through the tubes or peritoneum, the latter being the more frequent source of invasion. The periodic rupture of the Graafian follicles Schottlander considers invites the infection through the consequent traumatism. The tuberculous deposit may be found on the peritoneum, in the stroma, or in the Graafian follicles, and be of the miliary or caseous suppurative forms. If the tuberculosis infect the peritoneum and tunica albuginea, it may not penetrate the ovarian stroma.

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[1] *Arch. de locol.*, Paris, August, p. 581.

Edge,[2] quoting Merletti, says: "The *ovary* exhibits a certain resistance to tuberculous infection (only 25 instances in 172 cases of genital tuberculosis). This seems most probably to arise from the timely beneficial protective action of exudations and adhesions of the pelvic peritoneum by which the gland has been encapsuled; peri-oöphoritis is common, but true oöphoritis is rare."

TREATMENT OF GENITAL TUBERCULOSIS GENERALLY.—*Vulva.*—The whole affected area should be excised, and the actual cautery (Paquelin's) applied. If it be feasible, the margins of the skin can be brought together with bronze aluminium sutures, or, as is preferable, by a transplantation operation. Otherwise a Thiersch's grafting can be made. Or, the tuberculous tissue having been excised, the chloride of zinc paste may be spread on a piece of linen, placed near the exposed surface. This latter is subsequently dealt with. The X-ray or radium treatment may be tried should the disease recur.

Vagina.—As the disease generally affects the upper portion of the cornu and either fornix, while the portio is also diseased, the treatment must consist of amputation of the cervix and the affected portion of the vaginal wall. If the disease has seriously involved the uterus, or have travelled from the tubes down, then hysterectomy is indicated. Should the disease be diagnosed in its very early stages, and be limited to the cervix and vault of the vagina, the actual cautery or the chloride of zinc treatment may suffice to arrest it. If the cervix be slightly infected, curettage and the aplication of chromic acid (1 drm. to 1 oz.) should be tried at the same time.

Cervix and fundus.—However unsatisfactory the results may be of any operative treatment in tuberculosis of the uterus, still the only course open is that of the radical step of pan-hysterectomy. As has been just said, should the disease be localised in the cervix, free curettage with the application of chromic acid, or high amputation of the cervix with ligature of the uterine arteries, may be tried. The chloride of zinc treatment, applied as in car-

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[1] *Centralbl. f. Gynaek.*, Leipzig, June, 1894.

[2] *Arch. di ostet. e ginec.*, Napoli.

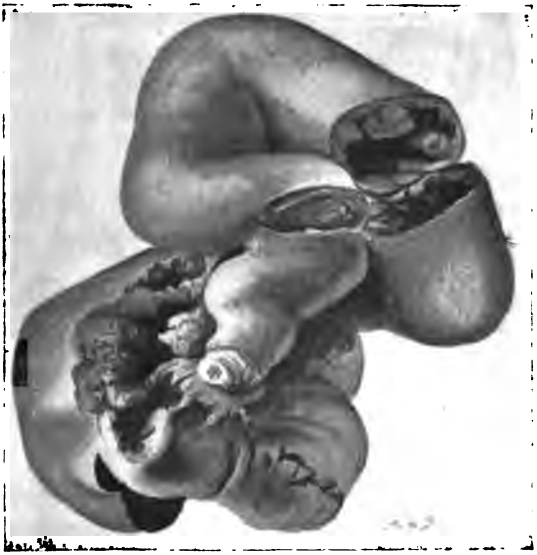

FIG. 1.—Adnexa, showing section of the dilated tube and the contained blood coagulum; also the adherent fimbria.

Tuberculosis of the Fallopian tube (seen from above and in front).

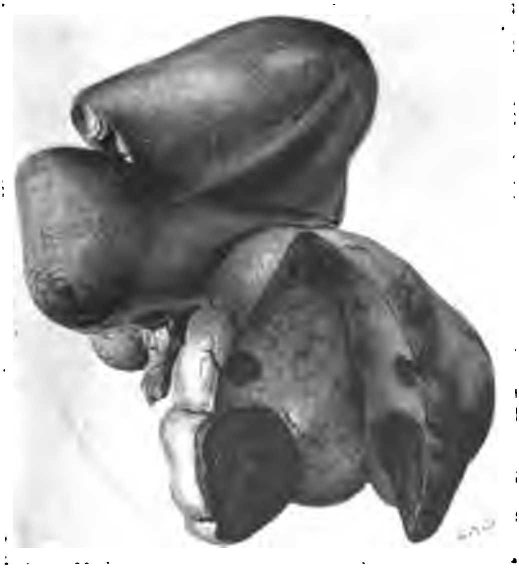

FIG. 2.—Same specimen, showing the ovary cut open and the recent corpus luteum.

Tuberculosis of the Fallopian tube (seen from behind).

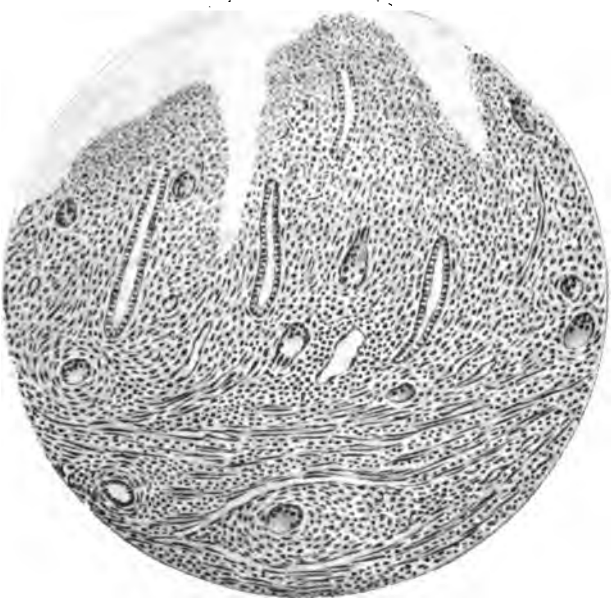

FIG. 3.—Primary tuberculosis of Fallopian tube. × 100.

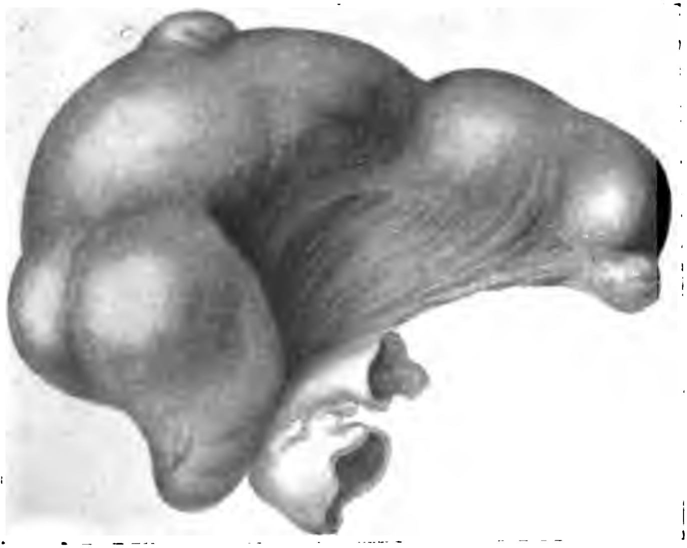

FIG. 4.—Acute tuberculosis of Fallopian tube. × 50. (J. Stevenson.)

cinoma, is here also suitable. Atmocausis or zestocausis[1] may have a good effect. When the disease is in the fundus there is little option, and the patient should be given the chance of a panhysterectomy.

Fallopian tubes.—Removal of the affected tubes is the sole treatment for tuberculous salpingitis. The question of removal of ovary or uterus at the same time is dependent upon the presence of the affection in either or both of these organs. Unless the ovaries be quite free of the disease, they should be removed, and the same course must be followed with regard to the uterus.

Ovary.—If the tuberculous disease be located in one portion of the ovary, and not diffused throughout its substance, the stroma and the follicles being healthy, while tubercles are not scattered over its surface, the ovary should then be resected and the healthy portion preserved.

The effect of laparotomy in tuberculosis of the female genitalia and the peritoneum.—The number of cases which have been reported as relieved, and in several cases cured, by the operation of cœliotomy when there has been tuberculosis of the peritoneum alone or of the internal genitalia, has proved clearly the beneficial effects which follow the opening of the peritoneal cavity in these cases. Sippel of Frankfort accounts for the favourable result by the formation of a curative serum following the hyperæmia, the result of the operation. Baumgart regards vaginal cœliotomy as curative as the abdominal. He advocates a short abdominal incision. Like Carpenter, he insists on the importance of rectal examination in diagnosis.[2]

Ligature of the ovarian arteries in tuberculosis of the adnexa.—In certain cases of inoperable malignant disease, as in myoma, ligature of the ovarian or utero-ovarian vessels has been followed by amelioration of the symptoms and arrest of the disease. Lindfors of Upsala has reported a case of inoperable tuberculous disease of both adnexa, in which there were extensive adhesions of the tubes to the ovaries and pelvic peritoneum. In this case, however, the presence of tuberculous affection was only surmised, as no proper histological examination was made.[3]

ABDOMINAL OR VAGINAL ROUTES.—Various operators prefer the vaginal, while others resort to the abdominal route in the extirpation of the tuberculous genitalia. In the rare cases in which, though the adnexa are affected as well as the uterus, the former are not adherent, Faure recommends vaginal hysterectomy with bisection of the anterior wall after Doyen's method, and with the removal of the adnexa. In the more common cases recourse must be had to laparotomy, and a much wider removal of the adnexa than need be undertaken in forms of disease in which conservative ideas may be entertained. An exception may be made when the disease is confined to one side, but when both are affected the uterus should also be removed. In any case, when the adhesions are organised and firm, the removal of the uterus greatly facilitates that of the adnexa. Should acute or sub-acute inflammation complicate the case, or if there be active and disquieting symptoms due to suppuration from secondary infection, the vaginal operation is to be preferred; but such complications are not common, as genital tuberculosis is generally slow in its course.

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[1] "Atmocausis and Zestocausis," von Dr. Ludwig Pincus, Dantzig, 1903.

[2] *Deutsche med. Wchnschr.*, Leipzig, 1901, Nos. 2, 3.

[3] *Centralbl. f. Gynaek.*, Leipzig, 1900, No. 41.

Should there be no adhesions, the technique of the vaginal operation is the same as in ordinary cases; if such be present, they should be detached piece by piece. When the uterus must be removed, it is better to work from below upwards by a subtotal hysterectomy, followed by the removal of the adnexa, in doing which the greatest care should be taken not to injure the attached viscera. If the case be an easy one, the operation may be performed, as usual, from above downwards; and in the most simple cases he recommends the method he uses for myomata, that is, section of the isthmus of the neck from behind with scissors, traction on the cervix, and the division of the broad ligament on one side after the application of a forceps to the outer side. When the disease is unilateral, Faure recommends Kelly's method of dividing the broad ligament on the unaffected side; then cutting through the neck with scissors and dividing the ligament of the affected side from below upwards, securing the arteries either before or after the section.

Pozzi also advises the abdominal route with pan-hysterectomy. As between the two routes, there can be no doubt that the abdominal offers the largest scope for complete extirpation of all the affected parts, and less chance of secondary contamination. Therefore, in cases in which the disease has attacked the internal genitalia, and where the evidence leans to the side of their serious involvement, abdominal cœliotomy is the safer route to follow. On the other hand, when the disease is more localised, in the cervix, or to the fundus, and the adnexa appear to be free and movable, the vaginal route, exposing less of the peritoneum, and involving less risk, is preferable.

ACUTE RHEUMATISM.

By JAMES M. BEATTIE, M.A. (N.Z.), M.D. (Edin.), *Senior Assistant to the Professor of Pathology in the University of Edinburgh.*

OF late years a considerable amount of evidence has been brought forward to prove that rheumatic fever is due to a specific organism, but one still finds a great deal of scepticism expressed even among leaders in the profession. This scepticism we do not condemn, especially as there is just now an inclination to attribute almost every disease to bacteria, or to other of the unicellular organisms. At the same time, we feel that the evidence for the bacterial origin of acute rheumatism is so strong that there is no room left for doubt.

For long, physicians have been impressed by the similarity of the clinical manifestations of the disease to those due to acute bacterial infection. The sudden onset, with perhaps slight malaise or sore throat, the loss of appetite, the thirst, constipation and high-coloured urine, correspond with what we get in ordinary septic diseases. The marked irregular temperature with its tendency to remissions and exacerbations, the profuse perspiration and the swelling of the joints, suggest at once pyæmia. The irregular distribution and the multiple and successive character of the joint affections, the tendency to relapses, and the liability to secondary infections of the heart, can be best explained by postulating a bacterial causal agent circulating in the blood, settling down at various irregular points, and having a special tendency to settle on serous surfaces, just as other bacteria have a special tendency to settle in the lung or in the bones.

The very fact that acute osteomyelitis and pyæmic conditions are so often mistaken for acute rheumatism, proves how closely related clinically the conditions are.

In addition to the clinical evidence, it has been shown by Newsholme that acute rheumatism occurs in epidemics recurring at irregular intervals, that the intensity of the disease varies in different epidemics, and that it is especially present when the subsoil water is abnormally low. The morbid anatomy of the condition is that of an acute infectious disease, and strongly points to a bacterial origin. It is not surprising, therefore, that many workers set about the task of finding the causal organism, but until the work of Poynton and Paine was published in 1900 we had not very satisfactory evidence from experiment. These observers, and more recently Walker and Shaw, have shown, by experiment with a micrococcus isolated from cases of acute rheumatism and chorea, that the disease can be exactly reproduced in rabbits by injections of the organisms into the blood stream.

Recently I have published work corroborating in all details the observations of these workers. I isolated a micrococcus from the synovial membrane of the knee of a girl with a very typical attack of acute rheumatism, and with the usual and characteristic history of previous attacks.

The organism was cultivated outside the body, and intravenous injections were made in a series of healthy rabbits.

RABBIT 1.—There was a rise of temperature of 1°·5 the day after the injection. This was irregularly maintained throughout. On the third day there was slight lameness and evidence of tenderness in the right knee. On the fourth day there was a slight systolic murmur over the heart. On the fifth day this was well marked, and there was swelling and tenderness of the left ankle-joint. At the autopsy, twelve days after inoculation, the synovial membranes of the affected joints were thickened and gelatinous. There was no evidence of pus. On the aortic valves there were well-marked recent vegetations, and in the right kidney there was a recent pale infarction.

Rabbit 2.—The injection was made into the right knee. There was no rise of temperature. At the autopsy, fifteen days after inoculation, the synovial membrane of the right knee was thickened. There was no pus. With the exception of a minute vegetation on the mitral valve, there was no other naked-eye lesion.

Rabbit 3.—Two days after inoculation, this rabbit developed well-marked chorea, which lasted for three days.

Pure growths of an organism, similar to the one inoculated, were got from the urine in all cases, from the affected joints and from the vegetations.

These results, combined with the much more complete series of other workers, seem to me to point definitely in one direction. The great liability to relapses, which is so characteristic of this disease, has led some observers to cast doubt on the bacterial origin. They maintain that these are more easily explained by the accumulation or over-production of the products of a perverted metabolism, this perverted metabolism being due to the chill or the wetting which is very frequently given as the cause of the onset of the disease.

But these relapses are more satisfactorily explained by supposing, either that the causal organism is widely spread in nature, or, what seems to me the more likely, that the organism may lie latent in the tissues for an almost indefinite time, and may become active where the vitality is lowered from any cause. We know that this latency does occur with other bacteria, *e.g.*, the bacillus of tuberculosis.

The objection, however, which has been put forward with the greatest pertinacity, but we cannot say with the greatest reason, is that the organisms which have been found are purely accidental, and that you may produce the lesions in rabbit with streptococci and other organisms.

It is said that streptococci, staphylococci, pneumococci, etc., have been isolated from vegetations on the heart valves, and from the joints in cases of acute rheumatism, and we are asked whether or not this micrococcus which we have described is not a form of one of these organisms.

In the first place, we take leave to doubt whether any of the organisms have been isolated in pure culture from successive joints, from vegetations, etc., from any case of true acute rheumatism.

We fully admit that in cases of endocarditis, ulcerative and non-ulcerative, streptococci, staphylococci, and other organisms have been isolated from the vegetations, from the joints, from the blood, etc., but these, we maintain, are not uncomplicated cases of acute rheumatism.

If one gets pyogenic organisms into the blood in any way, we know that they may lodge in the heart valves and elsewhere, and this will occur more readily if the valves have been injured by a previous attack of acute rheumatism. The other objection that has been raised, with, at first sight, a greater show of reason, is: this micrococcus which we have described is merely an attenuated streptococcus. Even to admit this would not make our position less strong. If it is a streptococcus, then it is a form of it which produces distinctive lesions, and it matters not in the least what we call it. There are features in culture which distinguish it from all the ordinary forms of streptococci. These need not be detailed here, as I hope to deal with them in another paper.

We do not claim that merely because we have found a micrococcus with distinctive characters in a number of cases of acute rheumatism, that therefore it is causal. We do not even claim that, because we have produced endocarditis or arthritis with it, that therefore it is causal. We know that some observers have produced endocarditis with the *Streptococcus pyogenes.* We have, however, by the injection of this micrococcus, produced in animals typical acute rheumatism and chorea, with endocarditis, polyarthritis, pericarditis, etc.

This has not been done, or, to say the very least, not confirmed with any other organism, or with any of the chemical or metabolic substances which have, at various times, been regarded as causal.

To sum up: the position is, that an organism, with distinctive characters from the ordinary bacteria with which we are familiar, has been isolated from typical cases of acute rheumatism and chorea (which is admittedly rheumatic in character) by different observers. This organism has been cultivated outside the body, by injection into rabbits has produced typical acute rheumatism and chorea, and has been recovered from the infected animals.

Streptococci, staphylococci, etc., do not produce these effects; and this organism, even when its virulence has been raised, does not, as Poynton and Paine have shown, produce the effects which are got by the injections of the ordinary pyogenic organisms.

Therefore we believe we are justified in claiming that if not the only, at least that it is one of the causal agents in acute rheumatism. This was the position taken up by Poynton and Paine in 1900. Their position has not been successfully assailed, but has been very much strengthened by further observations, and it seems extremely probable that we will yet be able to give to the *Micrococcus rheumaticus* the place in relation to rheumatic fever which the pneumococcus to-day holds in relation to pneumonia.

After what has been said, it seems quite unnecessary to deal with a recent objection—that the organism is merely the cause of the terminal phenomena in cases of acute rheumatism.

METASTATIC GONORRHŒAL OPHTHALMIA.

By WILLIAM GEORGE SYM, M.D., *Assistant Ophthalmic Surgeon, Royal Infirmary, Edinburgh.*

THE ordinary form, or possibly one ought rather to say, the well-recognised form, of gonorrhœal ophthalmia or conjunctivitis is the result of direct infection of the conjunctiva with pus from the urethra, and has the following marked characteristics. It is at the onset unilateral, though after a time the second eye is very apt to be infected from the first; the inflammation is violent; there is an immense and tight swelling of the eyelids, especially of the upper; there is abundant discharge, watery, thin, and serous for a day or two, but becoming rapidly more purulent and more copious, till at last large quantities of pure pus are poured out and run over the cheek; this pus contains myriads of gonococci; there is chemosis to an extent so great that the cornea may actually be partly buried below swollen conjunctiva, unless, indeed, the eyelids compress the globe so tightly from their own distension as to prevent this œdema occurring; ulceration and destruction of large areas of the cornea are frequent.

These, however, are distinctly not the features of that particular form of conjunctivitis to which I now wish to draw your attention. The variety of gonorrhœal conjunctivitis of which I wish at present to speak is entirely different: it has more in common with the joint affection, and with the iritis which not infrequently follow gonorrhœa; it is not caused by direct infection; it affects both eyes at the same time; the condition might sometimes be called smart, but never violent; there is but little swelling of lids, not at all an excessive degree of hyperæmia, and what there is is of the conjunctiva alone. The discharge, which is not copious, is rather thin, dilute mucoid, perhaps muco-purulent, and contains few or no gonococci. Ulceration of the cornea has occurred, but it is rare, and but insignificant when it does occur,—indeed, it is not improbable that even this complication is due to some interloping germ. Let me first relate the facts in two cases in which I was able to make the diagnosis.

CASE 1.—Mr. H., a young man whom I was asked to see by Dr. John Maclaren, had acquired gonorrhœa three months before, from which he had recovered under treatment almost completely, but about three weeks before I saw him the urethral discharge had spontaneously begun again, and at the same time several joints had become affected, and conjunctivitis had come on. Improvement, which was rapid, was again followed by a relapse, and I was then requested to see him. I found a well-marked conjunctivitis, with fairly abundant discharge, and some slight swelling of the lid margins, but neither symptom existed to a degree at all resembling what we see in conjunctivitis by direct infection. The conjunctiva was moderately injected, and the discharge was for the most part watery, with a little muco-pus mixed in it. At the margin of each cornea there was a very small clear ulcer; the irides were injected a little perhaps, but I should not call the condition an iritis at all—I think the hyperæmia of the iris was simply what one always finds in a keratitis or corneal ulcer in the adult. The left ankle and wrist were swollen and painful, and to a less degree the right wrist also. Under protargol and corrosive sublimate lotion the condition rapidly improved, and the patient went to his home in England to recover of his rheumatism. I regret that under the circumstances in which I saw him I had no facilities for making a bacteriological investigation of the secretion from his conjunctiva.

Case 2.—Mr. Z., a medical student, was sent to me by Mr. Scot Skirving; he had acquired gonorrhœa four weeks previously, which had been treated from its onset and had never been very bad. The conjunctivitis had existed for perhaps three days when he came to me, and was not at all severe, about as severe as a moderate attack of mucopurulent conjunctivitis is; it did not even approach in severity the usual type of gonorrhœal affection. There was but a moderate amount of discharge from the eye, and that not purulent; the ocular conjunctiva was but little injected, the part most full of vessels was the fornix; there was not much swelling of the lids, and the pain was not serious. On my inquiring as to joint symptoms, he admitted that he had that day felt a little uneasiness in the right shoulder, which discomfort he attributed to having lain upon that side, and had not thought much about it. Within a few days, however, several joints became implicated one after another. In this case I was able to get a thorough examination made of the discharge, such as it was, and though organisms of any kind were very scanty indeed, Dr. Shennan believed that he was able to recognise a few gonococci in the cells, but the condition was so far from typical that at first he had almost concluded there were none at all. The patient rapidly and completely recovered from the eye condition, but the joints gave a good deal of trouble.

In this case, too, I think one can definitely eliminate any idea of direct infection: first, because the patient realised the danger of transference of pus to the eye on general grounds, and also because, according to his constant and very proper custom, Mr. Scot Skirving had specially warned him of the risks; second, because the disease broke out practically simultaneously in the two eyes; thirdly, because the clinical features as to severity, swelling, discharge, and reaction generally were entirely at variance with one's experience of gonorrhœal conjunctivitis; fourthly, because the bacteriological examination revealed a state of things quite opposed to that which obtains in the usual form; and fifthly, on account of the almost simultaneous effusion into joints.

The disease of metastatic gonorrhœal conjunctivitis is quite new to my experience; those related above are the first two cases in which I have encountered it, or at all events diagnosed it. That my experience in this matter, or rather my want of experience, is not quite unique, is, I think, indicated sufficiently by the fact that there is no mention of the disease whatever in the following among very recent text-books or fresh editions:—Swanzy, Hansell and Sweet, Juler, Posey, Fox, May, Higgens, and Mr. Berry's new manual. It is mentioned, but without much more than mention, in the text-books of von Michel, Fuchs, and Lawson, as well as in Norris and Oliver's large work. The earliest paper on the subject with which I am acquainted is that of Van Moll of Amsterdam, who described several cases at the International Ophthalmological Congress at Utrecht in 1899. The six occurrences which he related affected only three patients, for one of these individuals had two separate attacks, and another had three; on two of these occasions the fresh attacks had followed upon a fresh infection of gonorrhœa. The type of inflammation which Van Moll describes in his paper is exactly similar to that which I have seen and have now related to you. It is true that in two of his cases the photophobia was much greater than had been present in either of my two, but then in those two cases of Van Moll's either the cornea was also attacked, or the iris, or both. The inflammation was always apt to relapse before complete recovery took place; this is well illustrated also in the former of my own cases. He refers to several writers, who mention the condition more or less accurately. The question of the existence of gonococci in the discharge is one of much interest and importance. Parinaud, Lichtenstein, Gielen, Sattler have all found none; Morax, who has done an immense amount of most valuable work on the bacteriology of the normal and abnormal conjunctiva, has repeatedly found none; in four of Van Moll's examples none were found. It has, indeed, repeatedly occurred in this form of conjunctivitis, as in some others, that no organisms of any sort have been discovered. It has been suggested, on account partly of the fact that in almost every case staphylococci have been demonstrated in the conjunctival sac, that a mixed infection of the urethra had occurred, that the gonococci were unable to penetrate the wall of the urethra as the staphylococci had done; following this, the staphylococci had thus been conveyed by blood or lymph to the joints, as well as to the eyes, where they caused iritis and conjunctivitis. At the discussion following Van Moll's paper, Axenfeld suggested that if one looked deeper in the conjunctiva and subconjunctival tissue, one might there find gonococci, or that the disease may be a more purely toxic affection; this suggestion is probably the correct explanation. Morax confessed to a little astonishment that the disease, though well known to surgeons in France, is hardly so much as mentioned in German papers. He had himself found that in animals it was possible to produce a conjunctivitis, of somewhat similar type to that which we have been describing, by introducing into the eye a dead culture of gonococci, which seemed to point to the disease being produced by the toxins generated by that organism. An interesting paper by Apetz on this subject appeared last year.[1] Lawford read a useful paper at the meeting in Cheltenham of the British Medical Association.

In the present issue of the Graefe-Saemisch "Handbuch," Groenouw, writing on this subject, says that Haab was the first ophthalmic surgeon definitely to diagnose and differentiate the condition; that was in 1881.

If one looks back to that storehouse of clinical knowledge, Mackenzie's text-book on "Diseases of the Eye," one finds that he there treats of two classes of gonorrhœal ophthalmia besides the direct infection variety. One of these is described as "gonorrhœal ophthalmia from metastasis," but this is a different condition from that of which I have spoken: it is an acute conjunctivitis arising, as Mackenzie believed, in consequence of sudden cessation of the gonorrhœal discharge. It was Saint-Yves who first described it, and he recommended that bougies smeared with pus from the eye, or with pus from some one else's gonorrhœa, should be passed along the urethra of the patient! The other form is spoken of as "gonorrhœal ophthalmia without inoculation or metastasis," and appears to be merely a more chronic form of the other, if, indeed, the occurrences were not —as Mackenzie seems to hint they might have been—merely coincidences which had no true relation whatever to gonorrhœa. Desmarres seems to have seen some cases of the disease, and Ricord also.

To my mind, it is quite clear that there is a disease such as I have been describing; that it is rare, especially when one considers the frequency of gonorrhœa; and that it is a condition for which surgeons, and more especially those who are much consulted regarding cases of venereal disease, should be upon the lookout.

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[1] *Wchnschr. f. Therap. u. Hyg. des Auges*, No. 43, 1903.

INTESTINAL OBSTRUCTION.[1]

By RUTHERFORD MORISON, F.R.C.S., *Surgeon to the Royal Infirmary, and Consulting Surgeon to the Dental Hospital, Newcastle-on-Tyne.*

(*Continued from page* 56.)

ILLUSTRATIVE CASES.

CASE 3.—*Acute intestinal obstruction due to Meckel's diverticulum; excision of diverticulum; recovery.* (Private hospital.)—A girl, æt. 7, was admitted on 17th February 1903. Four or five weeks before she had a sudden attack of vomiting during the night. This was succeeded by griping pains through the day. She had her bowels moved without aid and was well by the evening. Since then she had had other similar attacks. The present one began at 4 A.M. on the morning of 16th February, she having gone to bed well on the previous night. She vomited much; and bad griping pains came on at intervals of about every ten minutes, making the child cry out. The vomited matter was bilious, not fæcal. There was no tenesmus, and no blood or slime had been passed from the rectum. Examination at noon on 17th February 1903. The child looked healthy and well-nourished. The abdomen was a little distended. Nothing could be felt on palpation till there was an attack of pain, when a sausage-shaped swelling could be felt to form, harden, and disappear with a gurgle. Rectal examination revealed nothing. There was no blood-stain on the examining finger.

Diagnosis—"Acute intussusception."

Operation 4.15 P.M. (thirty-six hours after commencement of attack). The abdomen was opened by an oblique incision in the right iliac fossa over where the lump had been palpated. Much clear fluid escaped and distended red small intestine appeared. Immediately under the incision the cause of obstruction was found to be a Meckel's diverticulum, the tip of which was attached to the mesentery of the intestine close to it, forming a loop which constricted the underlying bowel. There were many adhesions at this spot between the ileum and colon, and several glands in the mesentery were as large as almonds. The diverticulum was separated, clamped at its base, ligatured, and cut off. The stump was disinfected with pure carbolic acid and depressed by a purse-string suture, reinforced by outside Lembert sutures, all of catgut. The abdominal wound was entirely closed by catgut sutures in layers. The diverticulum removed presented all the macro- and micro-scopical appearances of a Meckel's diverticulum. Two weeks later, when the wound was dressed for the first time, it had entirely healed. The child was well.

CASE 4.—*Acute intestinal obstruction due to adhesions; enterostomy under local anæsthesia; death.* (Royal Infirmary, Book 108, p. 17.)—

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[1] Statistics supplied by G. Grey Turner, Surgical Registrar, Royal Infirmary, Newcastle-on-Tyne, of cases of intestinal obstruction operated upon by Mr. Morison during 1903 in the Infirmary and private Hospital.

R. S., boy, æt. 14, was admitted on 23rd January 1903. Five days before admission he was awakened with an acute attack of abdominal pain which made him vomit. The vomiting and pain had been almost continuous since, but came on worse in paroxysms. Last night the vomit had become bad smelling (fæcal?). No flatus had been passed since the attack commenced, and an enema brought away only small hard fæcal lumps. He had no rise of temperature during the illness, and no previous attack.

On admission he looked very ill, had a pinched and anxious face, and was slightly cyanotic; pulse 72. On examining the abdomen, there was no hernia, and the scrotum and testes were normal. Per rectum distended intestines could be felt through the anterior rectal wall pushing down the recto-vesical pouch. The abdomen was considerably distended, especially at the upper part. Intestinal movements could be seen and felt.

Operation on admission, January 23, 1903.—A quarter of an hour before commencing, ¼ gr. of morphia was administered hypodermically. Infiltration anæsthesia was then obtained by means of eucaine. A short incision was made in the right iliac fossa, through which the first distended loop of small intestine was withdrawn. The intestine was opened and drained by Paul's tube, through which evacuation occurred at once. The operation was well borne, and the boy did not complain of the slightest pain.

January 25, 1903.—Still looked ill, but had no pain, and thought he was much better. Pulse 100, small, tongue coated but not dry. Vomited once. Almost unaltered milk and bile-stained fluid were escaping from the tube.

January 26, 1903.—He gradually got weaker, and died at 9 P.M. as if from some form of toxæmia.

Necropsy.—There was no peritonitis and no fluid in the belly. The enterostomy opening was at the junction of the upper one-third with the lower two-thirds of the small intestine. The obstruction was caused by an adhesion of the convexity of the small intestine about the middle of the jejunum to a tuberculous gland in its mesentery. The gut above was not greatly distended, but the difference between it and that below the obstruction was quite obvious. Many other diseased glands in all stages of tuberculous change were present. There was no general tuberculous peritonitis. *Note.*—There was no history obtainable of any previous illness.

CASE 5.—*Intestinal obstruction nearly two years after operation for appendix abscess; enterostomy; death.* (Book 109, p. 3.)—F. L., female, æt. 40; admitted to Royal Infirmary, Newcastle, on 30th December 1902. She had been operated upon in March 1900 for appendicitis with abscess. A second abscess which developed during convalescence was opened from the vagina. Until two weeks ago she had been quite well. Two weeks ago she had a sudden attack of pain in the stomach. It was a continuous pain, and made her vomit. Her bowels had not been moved since. On 31st December, after a dose of castor-oil (1 oz.), her bowels were thoroughly moved. The distension subsided, but she still complained of pain in the left hypochondrium.

January 1.—She was fairly well till the afternoon, when pain commenced and she began to vomit. At midnight there was moderate distension and visible peristalsis. The vomited matter was only food she had taken. After a simple enema her bowels were well moved.

January 2 at 11 A.M. I found as follows:—The patient looked ill, and complained greatly of griping intermittent pains. Her hands and face were cold, pulse 128 and very soft, tongue dry in the centre. There was a median scar on the abdominal wall between the pubis and the umbilicus. The lower part of the abdomen was slightly distended. Intestinal movements were so vigorous as to be obvious. The right hepatic region was tender. No mass was felt. Per vaginam the uterus was felt pushed back and fixed.

Diagnosis.—"Subacute intestinal obstruction from adhesions due to old appendicitis."

Operation, January 2, 1903.—Immediately after the conclusion of the examination, ⅙ gr. of morphia was injected hypodermically. Local anæsthesia was then induced by infiltration with eucaine. A few drops (not more than 25 minims) of chloroform were administered by inhalation as a placebo. Enterostomy was done in the right flank by opening the first presenting and distended loop of small intestine. A Paul's tube was tied into the bowel. The operation took a quarter of an hour. The operation was well borne, and there was very little pain. The tube discharged brown fæcal matter, but though there was relief of all urgent symptoms, she never picked up, and died five days later.

Necropsy.—There was no gross evidence of general septic peritonitis, but the intestines were sticky and slightly adherent. The enterostomy opening was found to be at one-third of the distance from the duodenum to the ileo-cæcal valve. The small intestine, both above and below the enterostomy opening, as far indeed as the seat of obstruction, was distended with gas. The obstruction was in the pelvis. A loop, 6 in. long, of small intestine was strangulated under a band (the result of old peritonitis). The band passed from the cæcum to the mesentery of the loop of intestine which had slipped under it. The constriction was not very tight, and there was no gangrene either of the strangulated loop or of the part over which the band passed. The obstruction was at the commencement of the lower one-third of the small intestine; and below this the bowel was collapsed, and the coils adherent to one another, to the pelvic wall, and to the pelvic viscera. There was no disease of any other organ. As evidence of an old general peritonitis, there were, in addition to the pelvic adhesions, adhesions between both lobes of the liver and the diaphragmatic peritoneum. No cause for this but the previous attack of appendicitis was found.

CASE 6.—*Advanced cancer of rectum; first evidenced by sudden onset of obstruction symptoms two months before admission; colostomy; hæmorrhage from divided colon; recovery.* (Royal Infirmary, Book 108, p. 666.)—W. R., male, æt. 50, admitted 6th January 1903. Two months ago the patient felt a sudden pain in his abdomen and anus, so severe that he fell down with the shock of it. It lasted for a week, and ever since he had had great difficulty with his bowels and pain in his sacrum and anus. Latterly he had frequent desire to defæcate, frequently going two or three times in an hour, but with small result.

What stools he passed were thin, watery, and offensive, and there was a good deal of blood.

On admission he was found to have an enormous growth in the rectum surrounding the whole lumen of the bowel, ulcerated in the centre, and fixed to the sacrum behind and to the bladder in front.

Operation, January 13, 1903.—First stage of left inguinal colostomy. Clip through mesentery, no sutures. Bowel not opened.

January 20, 1903.—Bowel cut across at 8 P.M. The cut surfaces bled a good deal. One vessel was caught and twisted. 10.30 P.M.—Some blood passed per rectum. The parts were fully exposed, but no spouting vessel was seen. Twice afterwards during the night fresh outbursts of bleeding occurred, but no definite vessel could be found.

January 25, 1903.—Left hospital.

April 23, 1903.—Fairly well. General condition much improved.

CASE 7.—*Intestinal obstruction due to malignant stricture of sigmoid in an old man; inguinal colostomy.* (Private Hospital.)—R. S., æt. 81, was admitted on 7th August 1903. He had been healthy all his life, and never had any trouble with his bowels till six months since. Since then he had been troubled with constipation, always requiring medicine before getting an evacuation. There was much rumbling of wind, and frequent desire to defæcate, with only a small quantity passing, often only mucus stained by blood. Attacks of constipation lasting for days were accompanied by swelling of the bowels and sickness.

On admission he was ill; had had no passage for four days; his abdomen was swollen and tympanitic. Per rectum, the lower bowel was normal. High up a finger could just reach the edge of a growth, and through the bowel wall a larger mass could be more distinctly felt higher up.

Operation—day of admission, August 7, 1903.—Left iliac colostomy. Some free fluid escaped when the abdomen was opened. Through the opening a hard growth in the bowel could be felt, fixed to the pelvic brim, and situated at the junction of the sigmoid flexure with the rectum. There were also small nodules of growth in the parietal peritoneum opposed to it. The bowel was opened, and Paul's tube tied in.

He left the hospital able to get about on 24th August 1903 (seventeen days after operation). He died suddenly at home five weeks later, apparently from syncope.

CASE 8.—*Obstruction from malignant growth in sigmoid flexure; colostomy in two stages; elastic ligature round sigmoid; symptoms of acute obstruction at once relieved by opening bowel; recovered.* (Royal Infirmary, Book 110, p. 13.)—D. S., male, æt. 65, admitted to Royal Infirmary, 24th October 1903. For six months he had been troubled with symptoms of chronic intestinal obstruction, and lost two stones in weight. The chief symptoms were distension and rumbling, with a desire to defæcate and inability to do so, and frequent diarrhœa. Blood had been passed in the motions.

On admission he was thin and pale. His abdomen was not distended, and nothing was discovered in it. Per rectum, a hard apparently fixed growth could be felt high up through the anterior wall of the rectum. On some days this was more readily felt than on others.

Diagnosis.—"Malignant stricture of sigmoid."

Operation, November 3, 1903.—The abdomen was opened by a median incision below the umbilicus. A growth was found, about 2 in. in length, in the middle of the sigmoid flexure. It was adherent to the fundus of the bladder and to the left pelvic wall, and was irremovable. The upper portion of the sigmoid flexure was drawn out through a small separate incision in the left iliac region, and fixed by clip forceps passed through its mesentery (first stage of inguinal colostomy).

November 12, 1903.—Up to the present the patient had done well. Flatus and some fæces had passed per rectum, and he was comfortable. A piece of thin elastic rubber tubing was drawn through the hole in the mesentery, and tied tightly round the projecting gut. The patient was comfortable till the following night, when about 7 P.M. his abdomen was distended and a small dose of morphia was given. At 11 P.M. he vomited. The bowel was now opened above the elastic ligature, when flatus and fæces escaped freely, and he was relieved at once (second stage of colostomy).

December 1, 1903.—Left the hospital well.

CASE 9.—*Acute intestinal obstruction subsiding into chronic cæcostomy; followed twelve days later by excision of malignant growth in sigmoid flexure; recovery.* (Infirmary, Book 109, p. 6.)—C. L., female, æt. 51. A week before admission the patient was suddenly seized, whilst resting after dinner, with severe abdominal pain. It was so severe that she was obliged to kneel on the floor and hold to a chair for support; and, though a brave woman, it caused her to cry out. She vomited freely. After being put to bed with poultices the pain was relieved, but did not disappear. The abdomen became distended and tender, and loud rumbling noises could be heard in it by any one near her. Though she passed some flatus, the bowels were never moved from this time.

Previous history.—When about 20 she had a severe attack of "inflammation of the bowels," and was in bed for two months. For the last two years she had no trouble with her bowels. The stools were natural, she had had no pain, and the bowels moved regularly every day. I saw her outside on the day of her admission. The vomited matter kept for my inspection had a distinct fæcal odour. There was nothing discovered at any of the usual or unusual hernial sites. The abdomen was somewhat distended, but not tense or tender. Nothing was discoverable on palpation, and the result of rectal and vaginal examination was negative.

Diagnosis.—Intestinal obstruction, cause unknown. I thought she was too ill, and that the abdominal distension was too marked to allow of a successful complete operation, and I admitted her to the Infirmary for observation on 2nd February 1903. After her admisssion she had castor-oil, calomel, and repeated enemata; and passed some flatus daily, though her bowels were not moved. On 7th February it was noted that her abdomen was more tense than before, and that she did not look so well.

Operation, 12 NOON, *February* 7, 1903.—After the administration of

⅓ gr. of morphia hypodermically, the area of the incision was anæsthetised by infiltration with eucaine. When the incision was being made, the patient was very nervous, and constantly cried for chloroform, though she admitted that she had no pain. A little brandy and water, of which she was too fond, was given to her to sip, and she made no further complaint during the operation. The cæcum was exposed, and was quite collapsed, though it was reddened and thickened, and looked as if it had recently been distended. A portion of it was drawn out, opened, drained by a Paul's tube, and fixed with harelip pins. Nothing escaped from it till it was washed out with hot water, when fæces began to be discharged. Two days after the operation there was marked improvement, and this continued. Examination revealed nothing.

Second operation, February 19, 1903.—The abdomen was opened by a median incision above and below the umbilicus, which was excised. A small constricting growth like a cord tied round the bowel was found in the upper part of the sigmoid flexure. There were no adhesions and no enlarged glands. A 3-in. incision was made in the left iliac region, and the involved piece of sigmoid was brought out there, and temporarily fixed by pushing a clip through its mesentery. The median incision was closed. The growth was then resected with about 1 in. of healthy bowel on either side. An end to end anastomosis with Murphy's button was made, and over this Lembert sutures of catgut. Examination of the growth showed it to be a small constricting carcinoma with most of the growth on the mesenteric side of the bowel. The lumen left would admit the tip of a finger with a little persuasion. Microscopically it was a columnar-celled cancer. Straightforward recovery with a small fistulous opening in the cæcum to be closed later if needful.

CASE 10.—*Cancer of sigmoid; sigmoidectomy; death.* (Royal Infirmary, Book 110, p. 8.)—J. C., male, æt. 61, was admitted 13th July 1903. Two years previously the patient first noticed an occasional pain in his abdomen, which made him feel sick. Six months before, the pain became worse, and he had severe vomiting and constipation. Three months before, the constipation ceased, and he had frequent diarrhœa. The pain, latterly, had been of a stabbing character, sometimes shooting into the penis, and sometimes into the back. He had not noticed any blood in the stools. He had lost three stones in weight during the last twelve months, and felt very drowsy for the last three (possibly the result of uræmia). *On admission* a hard fixed mass was felt in his left iliac fossa, and a diagnosis of cancer of the sigmoid was made. An average of 33 oz. of saline enema could be retained.

July 20, 1903.—Urine pale, sp. gr. 1003. No albumin. Urea, 2 grs. per oz. Blood count—leucocytes, 9·962 per cm.; hæmoglobin, 80 per cent. Operative interference was delayed because of the unsatisfactory kidney excretion, which suggested granular kidney. The urine steadily improved.

July 28, 1903.—Urine, sp. gr. 1020; urea, 9½ grs. per oz.

Operation, July 28, 1903.—The abdomen was opened by an oblique incision in the left iliac fossa. The growth was adherent to the peritoneum, and was separated and drawn out. It was very large, but the mesentery was not much involved. The growth was resected, the ends of the bowel were closed, and a lateral anastomosis was made with my bone button and a double row of silk Lembert's sutures. A rubber drainage-tube was left in the wound. The patient stood the operation very well, and the anastomosis appeared to be quite satisfactory. The growth removed was very large, and in the interior of the bowel had large masses on it like papillomata. At places the whole bowel wall was infiltrated. Microscopically it was an adeno-carcinoma. From the time of the operation he had a dry tongue and did not pick up satisfactorily, though there were no signs or symptoms of peritonitis. About noon on the seventh day (August 3, 1903), he was seized with acute abdominal pain, became collapsed, and died eighteen hours later.

Necropsy.—The wound was very foul. There was general septic peritonitis, and a large amount of thin purulent fluid in pockets between the intestinal coils and in the pelvis. The anastomosis had entirely given way, and there was no trace of the button. (It is possible that this was passed by stool and overlooked.) No enlarged glands were found. There were no secondary growths in the liver or elsewhere. Both kidneys were granular, and Dr. Bolam's report was that they showed distinct interstitial nephritis.

CASE 11.—*Multiple diverticula and chronic inflammation of sigmoid forming a tumour; sigmoidectomy; death.* (Royal Infirmary, Book 110, p. 16.)—J. M., male, æt. 60, admitted 22nd July 1903. He had always lived in England, so that dysentery was improbable. Three years ago he had had looseness of the bowels, which lasted about seven weeks. There was mucus and blood in the stools, and the purging was very frequent, as often as eighteen to twenty-five times a day. After this illness he remained quite well till the present attack, and the bowels were usually quite regular. Six months ago he began to have rumbling in the bowels. Five months ago he had some constipation, and required to take a course of mild purgatives. Three months ago he again had trouble with his bowels. Seven weeks ago a pain came on gradually in the bowels. He was constipated and took castor-oil. After a second dose he had a little motion, but was not relieved; a third dose pained him severely, but acted freely, and he got relief. He noticed that the motion was small and narrow and flattened on one side, and this has always been observable since, if the motion was seen; there was some blood with it. He passed flatus, but not freely. From this time he lost weight, perhaps 1½ stones; he had more or less pain and rumbling in his bowels, and had to take medicine to obtain an evacuation.

On admission, he appeared to be in good condition. Temperature, normal; pulse, 62; blood vessels, healthy. A large hard nodular freely movable mass was felt in the left iliac fossa. It was so movable that a change in the patient's position altered its site. Per rectum, a definite mass could be felt through the coats of the bowel, when the growth fell or was pushed into the pelvis. 20 oz. of saline enema could be retained.

Diagnosis.—"Malignant stricture of sigmoid."

Operation, July 28, 1903. The abdomen was opened by a long oblique incision in the left iliac region. The tumour was in the middle of the sigmoid flexure, and was free from adhesions. I had no doubt that it was a malignant growth. The mesentery was much thickened and rigid as if from inflammatory œdema, also the bowel above. The growth and about 6 in. of the bowel were excised. My intention was to make a lateral anastomosis, but the œdematous mesentery and rigid bowel interfered with this, so I made an end to end one, with catgut through all the coats internally, and Lembert's sutures of silk externally. An indiarubber drainage-tube was left in proximity to the junction. The patient stood this long operation well, but died two days later.

Pathology.—The portion of bowel removed felt like one infiltrated by a malignant growth, but on slitting it up there was no appearance to justify this view. The whole bowel wall was very much thickened, and its lumen contracted so as to admit only a small finger. The thickening was most marked in the muscular coat. The mucous membrane was hypertrophied, but otherwise looked normal. On closer examination, as many as thirteen diverticula were discovered hidden by folds of mucous membrane, and just large enough to admit the tip of the little finger. There were no signs of leakage from any of them, and one or two contained pieces of soft fæces. Microscopic examination of the growth by Dr. Bolam showed patches of round-celled infiltration, but no evidence of malignant disease. Of a gland removed from the mesentery he reports, however, that it appears to be infiltrated with epithelial cells.

Necropsy.—There was general peritonitis and a leak at the anastomosis. The colon above the anastomosis was very much distended. No further sign of malignant disease was found. The liver was free from growth, there were no enlarged glands, and no deposits elsewhere. From the middle of the transverse colon to the site of the anastomosis, there were a large number of small diverticula as in the part excised. There were none below the anastomosis. The kidneys were granular, and microscopically showed distinct interstitial nephritis.

CASE 12.—*Sudden obstruction due to malignant stricture of the sigmoid flexure.* (Private Hospital Book.)—Male, æt. 60, admitted 4th December 1902. For the past six months he had been constipated, and for the first time in his life had had trouble in getting his bowels to act. He could seldom manage this without medicine, and had been a good deal troubled with rumbling and flatulence. Four days previous to admission his bowels ceased to act, and medicine and enemata had not produced any good effect. There had been no serious pain.

On admission, he was a healthy-looking man in good general condition. His abdomen was much distended, tense, and tympanitic. The distension was most marked in the right flank and the right upper half of the abdomen. Nothing definite could be made out on palpation. Per rectum, high up an indefinite something was felt which gave rise to a suspicion of growth. Repeated attempts to move the bowels by enemata failed.

First operation, December 5, 1902.—The abdomen was opened as for left inguinal colostomy, and the sigmoid flexure was drawn out. *It was not distended,* but was red and congested. I had not the courage of my convictions, and as the bowel was not distended, returned it and opened the abdomen on the other side and did cæcostomy. *The cæcum was enormously distended and very tense.* When it was opened there was a very free escape of flatus and fæces.

Second operation, December 17, 1902.—Median incision excising umbilicus. A constricting growth was found at the end of the sigmoid flexure. Above the stricture the colon was enormously distended and full of fluid fæces. (It had been washed out through the cæcostomy opening on several occasions with apparently satisfactory results.) Taking this, the awkward position of the growth and signs of heart failure since the previous operation into consideration, I determined to do only a left inguinal colostomy.

Third operation, January 7, 1903.—The prolapsed portion of cæcum was easily reduced, and kept back with a piece of gauze. An incision was made round the skin opening, and the edges were turned in and sutured tightly with catgut. The incision was deepened until the peritoneal coat of the bowel was reached, and this involved opening the peritoneal cavity at one point. With Lembert sutures the first line was tucked into the cæcum. A strand of iodoform gauze was laid over the line of suture in the cæcum, the muscles were sutured over with catgut and the skin with silkworm gut, leaving only enough exit for the gauze drain.

January 23, 1903.—The patient went home all healed, and wearing a colotomy truss.

Case 13.—*Chronic intestinal obstruction involving large intestine, cause unknown; cæcostomy, relief; ileo-sigmoidostomy; recovery.* (Private Hospital.)—A male, æt. 46, was admitted on 18th February, 1903. In July 1902 (six months ago), he began to have a very uncomfortable feeling in the bowels, accompanied by rumbling noises and difficulty in getting the bowels to act. These symptoms passed off after a short course of aperient medicine, and he was well till four weeks ago. The same difficulty then recurred, and was accompanied by sickness and some vomiting. I saw him during this attack, and formed the opinion that the obstruction was in the large intestine, and probably due to a malignant stricture of the sigmoid flexure. The patient was not then urgently ill, and I advised rectal feeding, abdominal poultices, and small doses of morphia, if required, for the relief of pain. Flatus passed, and there was some improvement, but never satisfactory relief, and after a week of total obstruction I performed cæcostomy at home. With the exception of malarial fever twenty-two years before, the patient never had any serious illness.

On his *admission* a fortnight after cæcostomy, he was in fair general condition. All fæces passed through the cæcostomy opening. No mass was felt anywhere in the abdomen, or from the rectum. Only 1 pint of saline could be retained in the rectum, and with the patient in the knee-chest posture, none escaped through the cæcostomy opening (showing blocked colon). The diagnosis still was stricture of the sigmoid flexure, probably malignant.

Second operation, February 21, 1903.—The abdomen was opened by a 4-in. incision excising the umbilicus. The omentum was firmly adherent to the anterior abdominal wall, and access to the abdominal cavity had to be obtained through it. There were so many and so dense adhesions, that it was impossible to make a satisfactory exploration of the intestine, and no growth was discovered. The end of the ileum and the sigmoid flexure were sought for and secured. The ileum, which was adherent to the right wall of the pelvis, was cut across about 4 in. from the ileo-cæcal junction, and the distal end was closed by a continuous suture of catgut through all the coats, and outside of this a purse-string suture inverting the sutured end into the lumen of the bowel. An anastomosis was made between the proximal end of the ileum and the side of the sigmoid flexure by a Murphy's button reinforced by an outside row of silk Lembert sutures. No fæces passed through the cæcostomy opening after the operation.

After progress.—For the first six days he had no control over the motions, and usually had a good deal of griping pain before his bowels were moved. The motions were liquid for the first ten days, but afterwards were normal. He went home on the sixteenth day with the wound entirely healed, and in improved condition. The cæcostomy opening exuded a small quantity of mucus. The button had not passed. It passed three weeks later. At present, March 1904, his general condition is excellent and he has no trouble, except the slight discomfort of the cæcostomy opening.

Case 14.—*Intestinal obstruction supposed to be due to inoperable cancer; relieved by cæcostomy; return of good health; ileo-sigmoidostomy; recovery.* (Private Hospital.)—Male, æt. 51, admitted 6th January 1903. The patient was in hospital in October 1902. He was then very ill, with high temperature, a hard tender mass in his abdomen, and intestinal obstruction with distended intestines. Cæcostomy was performed.

He went home on November 8, 1902, with the diagnosis of ulcerating malignant growth and developing abscess, and a prognosis the gravest that could be given. Since the operation all the fæces had come from the artificial anus.

On admission (two months later), he had a bright complexion and looked like a man in excellent health. He had no pain and no complaint except of the irritation and inconvenience of the artificial anus. The abdominal skin round the cæcostomy opening was red and sore; the abdomen was flaccid, and not tender nor distended. Projecting from under the ribs, at a point corresponding to the splenic flexure of the colon, there was a hard nodular fixed tumour the size of a cricket ball, not tender and dull on percussion. An enema of 24 oz. only could be retained. None escaped from the cæcostomy opening.

The *diagnosis* now was "malignant growth of the colon, irremovable because of its fixity."

Operation, January 7, 1903.—The abdomen was opened by an incision between the umbilicus and pubis. The diagnosis made was so definite that the swelling was not explored.

The same operation was performed as in Case 13, namely, transverse division of the ileum, and an end to side anastomosis of ileum to sigmoid flexure with a Murphy's button.

After progress.—For the first few days the motions were fluid, but soon after became natural.

January 19, 1903.—He left the hospital with the wound healed (twelve days after operation). The discharge from the cæcostomy opening only left a small mucous stain on the dressing.

January 21, 1903.—The patient passed the button at home.

January 6, 1904.—(One year after ileo-sigmoidostomy.) The patient looks the picture of health, fat and strong. He has gained some stones in weight. The cæcostomy opening causes small inconvenience, as the discharge from it is trifling. He complains occasionally of rumbling pain in the belly. There is nothing discoverable on palpation. The former tumour seems to have disappeared.

CASE 15.—*Irremovable cancer of hepatic flexure of colon; obstruction relieved by lateral anastomosis; recovery.* (Book 108, p. 34.) —T. W. S., male, æt. 31, was admitted to Royal Infirmary, 9th May 1903. Ten weeks before, when in his usual health, he was suddenly seized with severe abdominal pain and vomiting. The pain was so bad that it made him sweat and roll about. It was all over the abdomen, and continued severe for twenty-four hours, when it abated but did not disappear. The vomiting ceased before the pain went away. Three or four days later he first noticed a lump in the abdomen. Since the onset he had had more or less paroxysmal pain, and a continuous pain in the lump. The pain had no relation to food, but was always worse after the bowels were moved. Whenever the pain got bad he vomited, The bowels were very irregular, constipation and diarrhœa alternating, but no blood had been noticed. Two days before admission he had an exceptionally severe attack, with vomiting and much rumbling, and his abdomen became distended. Since the illness began he had lost much weight and strength.

On admission he looked ill and thin, as if he had recently lost much flesh. Temperature, 98·2; pulse, 48. Tongue slightly coated and dry. The patient had hiccough. The abdomen was a little distended and tense. A rounded smooth tumour which moved freely with respiration was found under the costal margin.

Operation, May 14, 1903.—The abdomen was opened by an oblique incision extending from the back of the right ileo-costal space to the rectus muscle in front. The tumour was in the transverse colon near the hepatic flexure. It was large but easily drawn out of the abdomen. It felt as if confined to the interior of the bowel, and externally had the appearance of an intussusception. The puckered portion resembling the neck of an intussusception was cicatricial, and to this portion was firmly attached a diverticulum drawn out from the duodenum. The growth was also closely attached to the stomach, and a number of large but soft glands were felt in the mesocolon. At the close of the operation, its exact nature still remained doubtful. Anastomosis was made between the cæcum and transverse colon, beyond the growth, with a Murphy button and Lembert sutures.

May 26, 1903.—He made a good recovery, and went home with the wound all healed, but very thin.

CASE 16.—*Acute intestinal obstruction due to malignant growth attacking splenic flexure of colon in boy, æt. 22. Lateral anastomosis; recovery; return of symptoms; second operation; lateral anastomosis; imperfect relief; third operation; resection of portion of bowel; lateral anastomosis; death.* (Book 108, p. 7.)—P. M., æt. 22, was admitted to the Royal Infirmary, 11th May 1903. In April 1902 (rather more than one year before) the patient was in the Infirmary under the care of Mr.

Hume for acute intestinal obstruction. A constriction (new growth or tubercle?) was found in the splenic flexure of the colon. A lateral anastomosis was made between the transverse colon and the sigmoid flexure, and the boy made an uninterrupted recovery. He continued well till a week previous to his admission to my ward, when he had pain in his abdomen. This was followed by rumbling, vomiting, and inability to pass flatus or fæces.

A *diagnosis* of intestinal obstruction due to adhesions was made by Mr. Angus, who opened the abdomen on the second occasion. The small intestines were adherent to each other and to the parietes by such dense adhesions, that it was thought best to make an anastomosis between the lowest distended loop of small intestine and the transverse colon; and this was effected by a Murphy button and Lembert's sutures. The relief obtained after this operation was never complete, though the operative course throughout was entirely satisfactory. Griping pains gradually increased, attended by some diarrhœa but incomplete relief, and the boy's condition became intolerable.

Third operation, June 6, 1903, by myself. The old scar in the middle line was excised. Access to the abdomen was very difficult, for omentum and intestines were densely adherent to the anterior abdominal wall. The large intestine was enormously distended, measuring about 4 in. in diameter. An attempt was made to find the seat of obstruction by separating adherent loops, and holes were torn in the intestine in several places. The main obstructing mass was finally located in the splenic flexure, and just below this point a Murphy button could be felt in the bowel. Nine inches of damaged small intestine were resected; the lower end was closed and the upper taken into the sigmoid flexure by a Murphy button. The opening in the abdomen was closed by temporarily tied sutures over gauze pads. The operation lasted for one and a half hours, and the patient died eight hours after its completion. Microscopic section of an indurated piece of omentum removed during the operation showed that it was infiltrated with adenocarcinoma.

Necropsy.—With the whole of the abdominal contents exposed and lying on the table, it was quite impossible to make out the relation of parts owing to the extreme matting. The transverse colon was enormously distended; and it was evident that fæces were getting into it, but could not get out, and that the ileo-cæcal valve was efficient as the bulk of the small intestines was not distended. The matting was so dense and difficult to unravel, that the site of the two previous anastomoses could not be discovered. The obstruction was like a thickening of the wall of the splenic flexure of the colon, and extended for a distance of 2½ in. It looked more like dull scar tissue than growth. There were many enlarged glands, and here and there small hard white patches like a split pea on the peritoneum. Microscopic examination proved these and the primary growth to be adeno-carcinoma.

CASE 17.—*Malignant stricture of descending colon; illness commencing with acute obstruction; cæcostomy; death from perforation of gangrenous colon and sepsis.* (Book 109, p. 11.)—S. A., female, æt. 38, admitted to the Royal Infirmary, 4th March 1903.—She suddenly became ill at 3 A.M. on the morning of February 28 (four days before), with colicky pain in the abdomen and sickness. Morphia gave her relief but never complete. Flatus in small quantity was passed occasionally; but no fæcal matter, in spite of purgatives and enemata. During the last twenty-four hours her pain had increased and she vomited and had hiccough.

On admission at 6.30 P.M., she looked very ill, had a quick small pulse and no temperature. I concluded that she had intestinal obstruction due to some mechanical cause, was too ill for a complete operation, and not ill enough for enterostomy; and I ordered her stomach to be washed out, all feeding to be done by the rectum, and abdominal poultices, and small doses of opium to be given when required.

March 5, 1903.—She was much better, had passed flatus, was easy, and the abdomen was soft and flaccid.

March 6, 1903.—She continued to be better till the evening, when 1 oz. of castor-oil was ordered.

March 7, 1903.—No evacuation. Some pain in the night, but not severe; obstruction quite evident, for intestinal coils could be seen and felt contracting; located in large intestine from obvious distension of cæcum.

Operation, 4 P.M.—An attempt to perform cæcostomy under local anæsthesia had to be abandoned. Chloroform was administered. Cæcostomy. Paul's tube tied in. The tube did not act well at first. Next day the bowels had acted freely through the tube, but the patient never picked up thoroughly.

March 15, 1983.—(Eight days after cæcostomy.)—Patient had never done well. Temperature up and irregular. Pulse 144; bad cough.

March 16, 1903.—Died.

Necropsy.—The omentum and the anterior surfaces of the ascending, transverse, and descending colon were "glued" to the anterior abdominal wall by adhesions which tore easily. On the anterior surface of the omentum there were patches of purulent lymph, and in the left flank there was a small collection of pus surrounding a growth at the lower end of the descending colon. The growth was of the constricting variety, and looked like a string tied tightly round the bowel. Below the growth the bowel was normal. Above, it was distended; and wherever adhesions were separated small holes allowed liquid fæces to escape. Opposite the growth a single enlarged gland was found in the mesentery. On opening the colon the mucous membrane was found to be much destroyed throughout. What remained was in a condition of acute inflammation, and was occupied by multiple ulcers. The transverse colon was practically a slough, and fæces were only prevented from escaping by omental adhesions. The liver contained two growths, one measuring ½ in. × ½ in., and a very small one, both in the right lobe. The bases of both lungs were solid from pneumonia. Microscopic examination of the bowel and liver growths showed them to be adenocarcinoma.

CASE 18.—*Chronic intestinal obstruction; cæcostomy; relief; sigmoidectomy; two weeks later, death.* (Private Hospital.)—D. H., æt. 59, admitted 15th June 1903. His illness commenced three weeks before with a pain across the bowels and a bearing down sensation. He thought he required medicine, and took 1 oz. of salts, without result.

Then he took 1 oz. of castor-oil; and when this did not act, a second, but still without effect. He then sent for a doctor. Ever since, in spite of daily enemata and many varieties of purgative, he had had no satisfactory evacuation, and had often been sick. His general condition was fair. His abdomen was generally distended, but not greatly so. Intestinal movements could be heard, but not felt. There was no palpable tumour. Per rectum, nothing definite was discovered. Vigorous attempts were made to get the bowels moved, but without success.

Operation, June 17, 1903.—Cæcostomy.—For twenty-four hours after the tube was tied into the cæcum only a small quantity of flatus was passed through it, and the relief was so inefficient that it looked as if the operation was going to be a failure. After flushing the colon through the tube with saline, the bowels acted well and his general condition improved. Enemata administered per rectum in the knee-elbow position returned without any fæcal matter, and none came through the cæcostomy opening.

Second operation, July 1, 1903.—The abdomen was opened by a median incision about 5 in. long, excising the umbilicus. The intestines were empty, and the growth was easily found in the sigmoid flexure. It was small and of the constricting variety of cancer, and was freely movable; it was situated about the middle of the sigmoid flexure, and no glands could be felt. A second small incision was made in the left iliac region as if for colostomy, through which the growth was brought out of the abdomen. It was cut away, and the divided ends of the bowel were brought together by a Murphy button, and outside of this Lembert's sutures of silk. The anastomosis looked perfect when returned into the abdomen.

Pathology.—The growth surrounded the bowel, leaving an opening which would not admit the little finger. It measured vertically 1¼ in. on the mesenteric side, but only ½ in. on the convexity. One or two small enlarged glands were found in the portion of mesentery excised. Microscopically, the growth was an adeno-carcinoma. The patient appeared to be little worse after this operation. On 3rd July (two days after operation) he had calomel and castor-oil, which acted freely through the cæcostomy opening and by the rectum. He had a troublesome cough.

July 4.—Not so well; complained of pain in belly. Respiration quickened, more cough.

July 5.—Severe pain in belly; became collapsed, died 9.45 P.M.

Necropsy.—"General septic peritonitis." Pelvis contained pus and liquid fæces. The button was lying quite loose and exposed in the bowel. There was no union whatever at the site of anastomosis. Both lungs were œdematous at the bases. There was no discoverable enlargement of the glands, or secondary deposits in the liver or elsewhere. This patient was an alcoholic.

CASE 19.—*Recurring attacks of intestinal obstruction; removal of diseased appendix; no relief; second operation; ileo-colostomy.*—(Book 108, p. 55.)—J. H. S., male, æt. 25, admitted to the Royal Infirmary, Newcastle-on-Tyne, May 29, 1903. He had been quite healthy till six weeks before, when, whilst working in the pit, he severely wrenched himself on the right side. The pain made him cease work, and he vomited at night, and he had not worked since. Since then the pain had come on in attacks. It was located in the right iliac fossa, and was not bad enough to make him shout out or sweat or vomit. After the attack, his bowels were constipated for a few days.

On admission he looked healthy. He had an attack the night after admission, when the house surgeon found his abdomen swelled on the right side, and loud rumblings in it. Nothing could be felt, but there was tenderness in the right iliac fossa.

Diagnosis.—"Intestinal obstruction—from a band?" The attacks were thought not to be due to appendicitis, because they were quite sudden in their onset, passed off equally suddenly, and were not attended by any rise of temperature.

Operation, June 2, 1903.—The abdomen was opened by an oblique incision in the right iliac fossa. An enlarged appendix was found lying over the pelvic brim. On drawing it forward, there was found a twist through half a circle, constricting it near its entrance to the cæcum, and making the meso-appendix so tight that the vascular supply might have been interfered with. There were no adhesions, and the twist was so easily undone that in delivering the organ this righted itself. The peritoneal covering of the base of the appendix was dull and cicatricial in appearance, and the whole circumstances of the case led me to conclude that the conditions were all probably due to torsion of the appendix. The excised appendix was about 3 in. long. All vessels were much enlarged, so much so as to give it a nævoid appearance. The walls were very much thickened. The mucous membrane was swollen, and here and there showed small hæmorrhagic points. There was no ulceration. About 1 in. from the cæcal end the lumen was distinctly narrowed.

August 15, 1903.—Patient returned, complaining of pain as before, but not so severe. There was rumbling felt in the mid-abdomen. Nothing could be discovered. He was re-admitted in November 1903, complaining that his pain and the rumbling were just as before the operation, and that he was unable to work in consequence. He looked in first-rate health, and nothing was made out on physical examination.

Diagnosis.—"Intestinal obstruction from some cause not recognised at the previous operation."

Second operation, November 5, 1903.—The abdomen was opened by a median incision 5 in. long, excising the umbilicus. Complete exploration showed that there was nothing wrong in his abdomen except in the right iliac fossa. The lower 6 in. of the ileum was distended and thickened, and the peritoneal coat of it was roughened. The ileo-cæcal valve was distended, so as to admit easily two fingers. The cæcum and colon were not distended, and were normal. There were no bands or adhesions; and nothing was found to account for the obstruction, though the hypertrophied condition of the end of the ileum made it almost certain that such was present at times. The only suggestion that could be made—and that did not satisfy me—was that the cæcum, which was adherent to the scar, became kinked in certain distended conditions of the ileum, preventing the escape of its contents. A lateral anastomosis was made between the ileum and tranverse colon with my button.

November 21, 1903.—Sixteen days after operation, he left the hospital with healed wound. He still complains of some pain and rumbling in his bowels, but looks in perfect health. It may be that the privileges of compensation have some bearing upon his present condition.

Case 20.—*Irremovable tumour obstructing hepatic flexure of colon; anastomosis between cæcum and transverse colon; recovery.* (Royal Infirmary, Book 110, p. 23.)—F. H., male, æt. 62, admitted 26th June 1903. Up to three months before, the patient had been a healthy man. Then he had some pain in the abdomen, which gradually got worse. His doctor found a swelling the first time he saw him, and this had rapidly got larger. The pain was attended by loud rumblings and occasional sickness, and he lost his appetite and got very thin.

On admission, the patient was in poor condition and had severe pain. The abdomen was distended. A swelling could be seen on the right of and above the umbilicus. On palpation, it was tender, large, hard, and apparently fixed. It was dull on percussion, and there was a band of resonance between it and the liver dulness.

Diagnosis.—"Malignant growth of hepatic flexure of colon."

Operation, July 2, 1903.—The abdomen was opened by an oblique incision, extending from the ileo-costal space behind to the outer edge of the right rectus in front. The cæcum was much distended. There was a large fixed mass, involving the hepatic flexure of the colon, and round it a large amount of œdema. No positive signs of growth were seen, no enlarged glands, and no deposits on the peritoneum. I wished to make an anastomosis between the cæcum and the sigmoid flexure, but the limited length of the mesentery of the latter would not allow of this. I therefore drew down the transverse colon and joined it to the cæcum by a Murphy button and an outside circle of continuous silk Lembert sutures. After the operation I had some doubts as the malignancy of the growth, as the œdema around suggested a possible inflammatory origin.

July 13, 1903.—All healed. Entirely relieved, taking semi-solid food. Bowels regular. Four weeks and six days after the operation the button was passed, and he was doing well.

Case 21.—*Recurring attacks of intestinal obstruction; relief by medical treatment; operation during an interval; recovery.* (Book 108, p. 15.)—E. M., female, æt. 30, admitted to the Royal Infirmary, 28th February 1903. In July 1902 (eighteen months ago) she was seized suddenly for the first time with a severe abdominal pain and vomiting. The sickness lasted for two days, pain and distension continued for a week. A medical man, who was called in, said the attack was due to ptomaine poisoning, from eating a pie. During the whole attack the bowels would not act, but at last were relieved by an injection. After this and during the attack she felt a bearing-down pain in the womb, to which she had been subject more or less since she was 14. Six weeks ago I saw her, with Dr. Smith of Durham.

Her bowels had not been moved for ten days. She had vomited frequently a quantity of fæcal matter. Her abdomen was distended and tense, and intestinal contractions could be seen and felt. A tender, firm lump was felt in Douglas' pouch. Dr. Smith and I decided that she was too ill for a complete operation and too well for enterostomy, and palliative treatment was adopted. All food or drink was prohibited, nutriment being given by enemata, the abdomen was poulticed, and small doses of morphia were administered hypodermically when required for pain. In three days she took a turn for the better and was soon well, when I suggested exploration and removal of what was evidently some abiding cause of intestinal obstruction, probably located in the pelvis. To this proposal she would not listen, till a threatened attack, four weeks later, only relieved by hypodermic injection of morphia, made her decide in favour of operation.

On admission, she looked a thin, fragile woman. Nothing was discovered on abdominal examination. Per vaginam, there was a small fixed swelling felt on the right side of the pouch of Douglas.

Operation, March 5, 1903.—The abdomen was opened in the linea alba from the umbilicus to the pubis, the patient being in the Trendelenberg posture. After separating intestinal and uterine adhesions, the seat of obstruction was found in the pelvis. The right ovary and tube were adherent to the ileum, which was dilated above and contracted below. On division of these adhesions, the flatus in the bowel passed freely onwards. The peritoneum of the adherent gut was torn in its separation, and the raw surface was covered over with omentum. There was no evidence of tubercle. (The family history suggested this.) The right ovary and tube were excised. The tube was thickened, and contained thick purulent fluid. The primary cause of the peritonitis and adhesions was obviously a septic salpingitis.

March 16, 1903.—Patient left the hospital to-day with healed wound, and quite well.

May 11, 1903.—Returned to report. Quite well.

CASE 22.—*Appendicitis with fæcal fistula ten years ago; enterostomy for acute intestinal obstruction six years later; recovery; recurrence of obstruction; complete operation; death.* (This case is not included in the year's statistics which refer solely to my own operations.) (Private hospital.)—Female, æt. 22, admitted 18th October 1903. Ten years ago the patient had an illness said to be "inflammation of the bowels," which ended in abscess and a fæcal fistula which discharged in the groin for six months, then healed up, and left her in good health. Four years ago I was asked to see her at home in the country. She was then very ill, vomiting fæcal matter; there was a quick weak pulse, a much distended tense abdomen, and a history of acute complete obstruction of about one week's duration. With just sufficient anæsthetic to prevent pain, I opened the abdomen by a short incision in the right iliac fossa. There was some purulent lymph in the peritoneum, thought to be the result of acute appendicitis, and the small intestine was much distended and of a livid colour. After drawing out the first distended coil, I opened it and tied it in a Paul's tube. There was an immediate forcible escape of a large quantity of fluid fæces and flatus, and in half an hour the patient looked better and the abdominal distension was nearly gone.

Her recovery was straightforward, and in about two months the fæcal fistula had closed spontaneously. She remained well till shortly before her admission, when she was again seized with symptoms of acute obstruction, and in my absence was operated upon by my assistant. The operation and the post-mortem showed the following conditions:—The scar of my old incision was noted in the right iliac fossa, and a second scar (fæcal fistula) in the right groin below Poupart's ligament and on the outer side of the femoral vessels.

The small intestine was obstructed by an adhesion in the left flank, which bound the convexity of the intestine to the parietal peritoneum, and had drawn it out into a diverticulum. (Without great care this would have been cut during the operation.) Above the obstruction, the small intestine was much distended (4 in. in diameter), congested, and sticky; below, it was pale, flattened, and no larger than a little finger. On freeing the adhesion the gut beyond distended, and, though the attachment of the old enterostomy was obvious, it was left alone.

The necropsy showed a good deal of blood-stained fluid in the belly. The distended intestines had not recovered their colour or their size. There was no peritonitis. The remains of the old enterostomy opening in the ileum were carefully examined. The bowel at that spot was firmly adherent to the parietes. On separating it there was an opening involving about a quarter of the intestinal lumen. It could have been closed by suture without danger of narrowing the bowel too much. The vermiform appendix was about two inches long, and was adherent by its tip to the parietal peritoneum opposite the outer part of Poupart's ligament and in a position corresponding to the outside scar. A pull on the appendix depressed the scar. There were no other adhesions in the neighbourhood of the appendix. On its removal it was slit up. It was normal in appearance except ¼ in. at the distal end, which was obliterated and converted into firm fibrous tissue.

There were many adhesions in the right flank over the right lobe of the liver, in the left flank, and round the spleen, the only traces left of recovery following old wide-spread peritonitis.

CASE 23.—*Growth in transverse colon causing slight obstruction symptoms; exploratory incision; gangrenous patch on growth; fæcal and gastric fistula; death.* (Private Hospital.)—Female, æt. 42, admitted 19th *February* 1903. For seven months the patient had not been well from "indigestion," constipation, and increasing weakness. A very large movable tumour was found under the upper part of the left rectus muscle. My diagnosis was inoperable malignant growth of the colon, and I operated by request of the patient's friends and medical advisers.

Operation, February 21, 1903.—The abdomen was opened over the growth by a vertical incision 6 in. long through the left rectus muscle. A foul odour was experienced immediately the parietal peritoneum was divided; and on the front of the growth, which was not adherent anteriorly, there was a small yellow area, ½ in. in diameter, in the centre of which there was a tiny opening through which pus and gas were escaping. (Contact with, and the support of the parietes had prevented leaking.) The growth above was attached to the liver, and omentum was tucked all round it, so that at this stage of the operation, gallstones with ruptured gall-bladder appeared to be a feasible suggestion. An opening was made into the centre of the mass, and it was then found that the bowel (transverse colon) was involved in a growth which narrowed but did not obstruct it, for the lumen admitted my forefinger. The broken-down growth which escaped from the opening made had a most foul stench. A portion of the growth was removed for microscopical section, and an attempt was made to close the opening in the bowel by sutures and an omental graft. The abdominal incision was partially closed over gauze packing.

After progress.—The wound discharged blood-stained serum, which two days after operation had a slightly fæcal odour. This gradually became more pronounced, till fæces and then the stomach contents escaped from the wound. She was sent home on 9th March (sixteen days after operation), and died exhausted a few days later. There was no necropsy. The microscopic report by the Clinical Association is of interest in connection with the history of the after progress, suggesting, as taken together they do, that the growth was primary in the stomach. "This specimen of section shows a diffuse infiltration of the fibrous and fatty tissues with a soft spheroidal-celled carcinoma. The structure is quite unlike the columnar-celled cancer which is usually primary in the bowel."

Case 24.—*Ovariotomy nine years before; death from intestinal obstruction due to a band the result of the old operation.* (Private Hospital.)—A female, æt. 33, was admitted 5th February 1903. I had performed ovariotomy nine years before, and removed a dermoid cyst of the right ovary. She was perfectly well till fourteen days before admission, when she had a sudden severe pain and developed the typical symptoms of intestinal obstruction. *On admission* she was very ill, too ill for an operation, and died a few hours later.

Necropsy.—There were signs of general peritonitis and liquid fæces in the peritoneum, and a quantity welled up from the pelvis. The first visible coils of small intestine were enormously distended. The obstruction was found within 2 in. from the end of the ileum. It was caused by a very tight band passing over a loop of the small intestine. The band was the pedicle, rounded and like a piece of string, of the excised right ovary, which had adhered to the peritoneum of the right iliac fossa, forming a loop. The band was so tight that it would not admit the tip of a forefinger, and had through it a strangulated loop of bowel about 2 in. long. The strangled bowel was completely gangrenous, except where the band passed over it, and had ruptured on the convexity, leaving a hole ¾ in. in diameter. There were other small adhesions in the pelvis. There was no trace of the silk ligature which had been used to tie the pedicle.

Case 25.—*Sarcoma of prostate; obstruction of rectum; death.* (Royal Infirmary, Book 108, p. 355.)—J. B., male, æt. 32, was admitted to the Royal Infirmary, 13th *February* 1903. Six weeks before, urinary trouble commenced with a frequent desire to micturate and some pain. Finally, he had an attack of retention which was relieved by a catheter, but which was followed by others. He was admitted with one of these attacks, of two days' duration.

On admission he looked fat, pale, and unhealthy. He complained of but little pain, though he had a marked sense of distension. His abdomen was much distended, from the pubis to above the umbilicus, by a swelling which looked and felt like the seventh month pregnant uterus. Some pus escaped from the urethra. On attempting to pass a catheter, free bleeding and escape of pus occurred when the prostatic urethra was reached, but no urine could be obtained.

Operation, *February* 16, 1903. By Mr. G. Grey Turner.—The bladder was opened suprapubically and several pints of foul urine were drawn off. A tumour still remained, which was thought to be a prostatic growth. Exploration from the rectum with a syringe drew off only blood. The bladder was opened suprapubically for permanent drainage. An enormous mass projected into the bladder at the trigone, and examination of this with one finger in the bladder and another in the rectum showed that it was somewhat fixed to the left pelvic wall. A small tag which was found in the bladder was examined microscopically, and proved to be a spindle-celled sarcoma with myxomatous change. Relief followed this operation.

March 26, 1903.—Patient exceedingly ill. Some fæces were voided unconsciously, but no flatus. Vomiting for last three days. Abdomen much distended. The left leg was much swollen. Urine scanty. Examination per rectum showed that the growth had increased greatly in size, and was now breaking down into the anterior wall of the rectum, so that portions of it came away on the examining finger. Patient died during night.

Necropsy.—A small amount of free fluid was present in the belly. The sigmoid flexure was enormously distended and congested, being at least 4 to 6 in. in diameter. It appeared to fill the whole abdomen as it lay in front over the intestines and stomach. The cæcum was also much distended, the descending colon and the flexures being least so. There were a few flakes of purulent lymph on the transverse colon. The growth sprang from the prostate, filled the whole true pelvis, and projected up into the false pelvis, carrying the bladder upwards and in front of it. The rectum was flattened out and jammed against the posterior wall of the pelvis. Some of the growth was fungating through the suprapubic incision, and on opening the bladder it presented the appearance of a huge polypus. Both ureters were pressed upon and dilated, and the kidneys were hydronephrotic. Below, the growth had burst through its capsule, and on the left side had come through the obturator foramen with the vessels. The pelvic veins were much enlarged, and several were in a state of thrombosis. There were a few nodules of growth on the pelvic peritoneum, but no enlarged glands were discovered. Both lungs contained masses of growth. Microscopically both the prostatic and lung tumours were spindle-celled sarcoma.

Case 26. — *Retained Murphy button; enterostomy; recovery.* (Private Hospital).—A young man, æt. 19, was operated on in December 1902 for tuberculous stricture of the end of the ileum, causing chronic intestinal obstruction. His general condition was then very bad. He was unable to leave his bed, was much emaciated, and looked as if he only had a few days to live. An anastomosis was made with a Murphy button between the ileum, above the stricture and the transverse colon. He left the hospital on 21st December 1902, and was quite well up to the beginning of March, having gained 2 st. 2 lbs. in weight. Then he began to have acute attacks of abdominal pain, especially in the right side, with loose evacuations about four times in the twenty-four hours. After a holiday in the country during April he got well, but three weeks later his pain returned. He was admitted for the second time on 20th July 1903, looking very well, fat, and strong. The Murphy button had never been passed, and could be plainly seen with the fluorescent screen, in the right iliac fossa, and about 2 in. to the right of the umbilicus. The hole through the button was distinctly visible in certain positions. The boy himself said that he could feel the button sometimes under the scar in the right iliac fossa. The diagnosis arrived at was that his attacks of abdominal pain might be due to the retained button.

Operation, July 22, 1903.—An oblique incision in the right iliac fossa excised the old scar and opened the abdomen. The omentum was adherent to the line of incision. The site of the anastomosis was immediately found. It looked like a fibrous ring connecting the ileum with the transverse colon. The button was in the ileum, distal to the anastomosis, between it and the stricture. It was freely movable in the ileum, but could not be squeezed through the anastomotic opening, and was cut down upon and removed through an opening made in the ileum. The anastomotic opening was explored through this incision. It was quite free, and readily admitted my forefinger. The incision in the bowel was closed by a continuous suture of catgut through all the coats, and outside of this, silk Lembert sutures. The intestine had now a normal appearance, and, with the exception of the single stricture, for which the first operation had been performed, no other lesion was discovered. There were no signs of active tubercle.

The button was much blackened, and nearly all of the plating had disappeared. It had a putrid odour. The catgut used as a suture along with the portion of gut in the clasp of the button were still in position. He left hospital with the wound healed, eleven days after operation (August 1, 1893).

At present, March 1904, he is well.

CASE 27. — *Cancer of descending colon; attempt to relieve obstruction by lateral anastomosis; death.* (Book 108, p. 38.)—J. S., æt. 73, was admitted to the Royal Infirmary, 4th June 1903. Four days before he had had a sudden attack of diffuse pain all over the bowels, which shortly settled in the left groin, and had continued since. He vomited three times a day, and the pain was increased by taking food, which he had attempted to eat as usual. The bowels had not moved since the attack commenced, and previous to this he had had trouble with constipation, though nothing serious enough to consult a doctor about.

On admission.—He was a healthy-looking, very stout old man. He had a reducible hernia of twenty-five years' duration. Nothing was felt per rectum. The abdomen was generally tender but quite flaccid, and intestinal movements could be plainly seen and felt, limited to the neighbourhood of the cæcum and transverse colon. No mass could be felt on percussion; there were signs of free fluid in the abdomen. He could not retain an enema of more than 26 oz.

Diagnosis.—Chronic obstruction, probably due to malignant stricture of sigmoid. For three days attempts were made to get his bowels to act, but without success.

Operation, June 8, 1903.—The abdomen was opened, as for inguinal colotomy, by an oblique incision in the left iliac fossa. The small intestines were much distended, and there was a quantity of free fluid. A large fixed growth was found at the lower end of the descending colon. A lateral anastomosis was made, between the transverse colon and the sigmoid flexure, by a Murphy button and Lembert's sutures. The transverse colon was distended with fluid fæces, which gave rise to considerable trouble. The operation was well borne.

June 12, 1903 (four days later).—Progress up to this date was very satisfactory. Bowels well moved after a dose of castor-oil.

June 13, 1903.—As the tongue was still dirty, a second dose of oil was given. After it acted he complained of pain, and became collapsed.

June 15, 1903.—He never picked up properly again, and always, till his death (a week after operation), complained of some pain, though not much, in the belly, which was neither markedly rigid nor tender, nor distended.

Necropsy.—There was general septic peritonitis. The omentum in the neighbourhood of the anastomosis appeared to be almost gangrenous. As soon as the belly wall near the growth was pulled away, thin liquid fæces escaped in large quantity. The button was lying exposed, and almost loose, at the site of the anastomosis. The growth was a large malignant ulcer involving the bowel for 2½ in. in the vertical direction surrounding the lumen, and fixed mainly by the mesentery. There were no deposits in the liver. Microscopic examination showed that the growth was an adeno-carcinoma.

Case 28. — *Inoperable cancer of rectum; chronic intestinal obstruction; colostomy, recovery.* (Book 110, p. 551.) — R. P., male, æt. 53, admitted to the Royal Infirmary, Newcastle-on-Tyne, on 10th August 1903. Two years before he had trouble with "piles." One year before, "blood and matter" began to be discharged from the bowel. Six months before he began to have difficulty in getting his bowels moved, and he noticed that the motion was small and flattened. During this time he had had pain in his back, and difficulty in passing water. Straining to do so caused discharge from his rectum. Five months before he noticed difficulty in passing flatus, and since then had been much troubled by flatulence. Latterly, he had been unable to get relief, but had no urgent symptoms of obstruction.

On admission he was in fair general condition. The rectum was blocked by a large fixed tumour with all the characters of cancer.

Operation, August 11, 1903.—Left inguinal colostomy with Paul's tube.

August 13, 1903 (two days later).—Very uncomfortable. No flatus or fæces have passed through the tube, in spite of irrigating the tube and colon with saline, and the administration of calomel. The abdomen was distended, and he had vomited. The tube was removed. The mucous membrane of the colon was very œdematous. A large soft catheter was passed into the upper end of the bowel, and a lot of flatus and liquid fæces escaped, to his instant relief. Good recovery from this date.

August 18, 1903.—An elastic ligature was tied round the bowel. It cut its way out in four days, without pain or trouble.

CASE 29.—*Tuberculous cæcum; chronic intestinal obstruction; excision of cæcum and vermiform appendix and portion of ileum; recovery.* (Book 108, p. 116.)—W. S., male, æt. 31, admitted to the Royal Infirmary, Newcastle-on-Tyne, 3rd January, 1903. He was in good health till six months before, when he began to have attacks of pain in the bowels. The pain was severe and made him feel sick, but he did not vomit. He had had five of such attacks, which laid him off work for a few days, but he was able to work in the intervals. The last attack, which commenced a fortnight before, was the worst; for he had not got well of it, and his doctor found a lump in his right side.

On admission he looked fairly well, his pulse and temperature were normal, and he had no pain. The abdomen was not distended. A distinct rounded swelling could be seen in his right iliac fossa near the centre of Poupart's ligament. On palpation the mass appeared to be about the size of a hen's egg, fixed, hard, and tender, and definitely circumscribed. The results of examination of the chest and of the sputum for tubercle bacilli were negative.

Operation, January 6, 1903.—The abdomen was opened by an oblique incision in the right iliac fossa. There were no parietal adhesions. The exposed portion of omentum was œdematous, and fixed by adhesions over the cæcum. The appendix was embedded by very dense and firm adhesions; the cæcum and the ileo-cæcal valve were much thickened. Two inches of the ileum, the appendix and cæcum, and the thickened parietal peritoneum were excised, and an end to end anastomosis was made between the divided end of the ileum and the ascending colon with a Murphy button. This was easy, for the ileum was larger and the colon smaller than normal. Some enlarged glands were observed in the mesentery of the small intestine, but were not interfered with. There was no fluid in the peritoneum, and no sign of tuberculous peritonitis. The wound was sutured in layers and entirely closed, and the raw internal surface was drained through an independent opening in the loin. The specimen showed much thickened appendix and bowel. There were some enlarged glands in the meso-appendix not caseating. There was a small ulcer on the outer surface of the ileum, opposite which the bowel wall was very thin. The ileo-cæcal valve was thickened and contracted, and admitted the tip of a forefinger with difficulty. There was no definite ulceration found in the interior of either the cæcum or the ileum, but opposite the external ulcer in the latter there was some thickening. Microscopic examination of the bowel showed it to be tuberculous. In the appendix it is reported that nothing typical was found, only signs of chronic inflammation.

November 15, 1903 (nine days after the operation), he passed the button.

November 22, 1903.—Healed; went home.

At present (March 1904) he looks delicate but feels in fair health; makes no complaint.

CASE 30.—*Subacute appendicitis; many intestinal adhesions;*

obstruction seventeen days after appendicectomy; recovery without operation. (Infirmary Book 110, p. 58.)—J. M., male, æt. 44, admitted to the Royal Infirmary, Newcastle-on-Tyne, 2nd July 1903, with symptoms of subacute appendicitis.

Operation, July 4, 1903.—The abdomen was opened by a long oblique incision in the right iliac fossa. Coils of small intestines were closely adherent to the belly wall and to each other. The cæcum was separated, and purulent lymph was found here and there, but no collection of pus. The appendix, long, hanging into the pelvis, and very adherent, was removed. The recent intestinal adhesions, pelvic and other, were not interfered with further than was necessary for the removal of the appendix. The abdomen and pelvis were drained with gauze and a long drainage-tube.

The patient, who was ill and weak on admission, made fairly satisfactory progress till 21st July (seventeen days after appendicectomy). He then complained of paroxysms of abdominal pain, and vomited. Intestinal movements could be seen and felt. Knowing the difficulties from widespread dense adhesions that had to be encountered if operation was undertaken, and considering the feeble health of the patient, I resolved to break my usual rule of operation so soon as the diagnosis is assured, believing that his chances of recovery were better without than with a radical operation. Calomel and a mixture of magnes. sulph., magnes. carb., and aq. menth. pip. was ordered, and an enema to follow. After the enema he passed a little flatus, and at night was easier.

July 22.—Better. He had vomited twice, stomach contents only. Had passed a little flatus. Distended intestines felt per rectum. All mouth feeding was abolished, and nutrient enemata were administered. The abdomen was kept hot with alternate poultices and cotton-wool. Ten minims of liq. morphia in 1 drm. of peppermint water was given when pain required it.

July 23.—Conditions were the same. Had hiccough during the night; there was no visible distension; he had passed a little more flatus. Treatment to be continued.

July 24.—The same.

July 25.—He looked worse in the morning, hiccough had become more troublesome, the upper abdomen was distended. Twice subcutaneously infused with one pint of saline during the day. About midnight he passed a quantity of flatus with great relief, and from this time recovered rapidly.

Case 31.—*Tuberculous ulceration and stricture of small intestine; recurring attacks of intestinal obstruction; resection; anastomosis by rubber rings; gall-stones; recovery; second operation for removal of rings.* (Royal Infirmary, Newcastle-on-Tyne, Vol. cix. p. 5.)—A female, æt. 49, was admitted for the first time on 19th December 1901. She was feeble and much emaciated, and gave an eighteen months' history of recurring attacks, gradually increasing in severity, of intestinal obstruction. Loud intestinal rumbling was heard, and there was visible peristalsis with a ladder-like pattern of the distended intestines.

A hard fixed tumour was found in the right iliac fossa, and a large round swelling came down under the right costal margin.

Operation, December 23, 1901.—The abdomen was opened by an oblique incision over the cæcum. The upper tumour was found to be a much enlarged and tense gall-bladder. It contained clear mucus and eighteen gall-stones, one of which was tightly impacted in the cystic duct. After removal of its contents, the opening in it was closed by a purse-string suture. The iliac tumour was found to be very adherent to the bladder, and was thought to be a malignant growth of the small intestine. Eighteen inches of the intestine, including the growth, were removed, and an end-to-end anastomosis was made by rubber rings and Lembert sutures. (In consequence of this experience, I have not used rubber rings again.) The abdomen was completely closed by suture of the wall. The loop of bowel removed was much thickened, and its lumen was strictured. On section there were extensive ulceration. It was thought to be cancerous. Microscopical examination showed typical tubercle. Three weeks later she left the infirmary in improved condition with healed wound.

Re-admitted, May 2, 1903.—It was impossible to recognise her, such improvement had occurred in her general condition. She looked (for her) stout, healthy, and red-faced, though she said she had lost condition during the last few months. Her visit was because of recurring attacks of abdominal pain and diarrhœa. She had never passed the rubber rings, and attributed her symptoms to this. Palpation over the right iliac fossa discovered the rings, which could be plainly felt.

Second operation, May 5, 1903.—The old scar was excised, and the abdomen opened. To my surprise there was definite evidence of active peritoneal tuberculosis. The rings were removed by an incision in the ileum over them, and the opening was closed by a continuous locked suture of catgut through all the coats and outside of this interrupted Lembert silk sutures. The patient was not at all ill after this operation, and left the hospital, 11th May (six days later), with the wound looking well.

On August 1903 she returned because of continuance of diarrhœa. Dr. Fraser of Wark reported her death in January 1904.

THE RELATIONS OF THE INSANITIES TO CRIMINAL RESPONSIBILITY AND CIVIL CAPACITY.

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VII.

(*Continued from page* 69.)

From the cases which we quoted in our last paper, it appears that the leading principle that has been laid down is that, in a question of responsibility, we must look wholly to the state of the intelligence with regard to the particular act at the time at which it was committed. Delusions are treated simply as a special element in the general question of the prisoner's knowledge. If the delusion so misrepresented to him the character of the act which he was about to commit, that he believed himself to be acting legally, he must necessarily be acquitted. If, on the other hand, the delusion, though distorting the character of the act, still left it, even in the view of the accused, one contrary to the law of the land, the plea is of no avail, because, although acting under error in point of fact, he has still been shown, even on his own view of the case, to have acted with criminal intent. The careful manner in which the judges state that the question of knowledge must be put in reference to the particular act at the particular time, although apparently at variance with some of the modes in which the question had previously been put to the jury, represents no material difference in point of law. No one ever maintained that if the effect of mental disease were to prevent the accused knowing the nature of the particular crime at the time that he committed it, he could be found guilty, because he was clearly responsible at other times and in other circumstances. The question was always plainly enough one of fact; and if in certain cases we find that the judges left the question to the jury, in terms which indicated that the matter for their consideration was the general capacity of the accused to distinguish right from wrong, this arose simply from the fact that in many instances they either overlooked altogether those partial and temporary phases of insanity, or regarded them in the same light as outbreaks of passion, which might have been suppressed by the general intelligence and power of control which the accused seemed to possess.

A more serious question arises as to the meaning of the words, right and wrong. In some of the earlier cases the phrases "knowledge of right and wrong," or "knowledge of good and evil," are used in such a way as would almost imply a reference to a moral and not to a legal standard. In Offord's case (5 C. & P., 168), Lord Lyndhurst put the question, whether the accused "knew that he was committing an offence against the laws of God and nature." Yorke, the Solicitor-General, in the case of Lord Ferrers, spoke of the "faculty to discern between moral good and evil." The Attorney-General, in Hadfield's case, referred to "a natural impression in the mind of man of the distinction between good and evil." All these expressions suggest a possible reference to a higher standard than is implied in such phrases as "contrary to law" and "punishable by law." It is clear enough, however, from various passages in the judges' opinions, that they used the words right and wrong in a purely legal sense; and that we must therefore take it that every one is responsible for an act which he knew at the time of its commission to be an offence against the law. In this sense, cases like Macnaughton, Bellingham, and M'Clinton, and even such cases as Hadfield and Martin, in which the accused believed themselves to be acting under divine command, fall clearly within the limits of responsibility.

We must examine in more detail the application of the rule thus laid down. In its strictest sense, it is only applicable to a certain proportion of the crimes committed by the insane. In the deeper grades of imbecility and dementia, in stages of acute mania, and in the cases which occur in connection with epilepsy, and sometimes perhaps with extreme melancholia, in which consciousness seems to be for the time suspended, we find, of course, no difficulty; and those few cases are equally clear in which we have positive evidence of a delusion, which makes the crime appear a perfectly lawful act. But when we pass beyond this comparatively narrow circle, we find it by no means easy to define the limits of the rule. It is scarcely possible to conceive that it has ever been intended to put so strict a sense upon the phraseology of the law, that we must confine the application of the rule to those cases in which there is absolutely no trace of the knowledge which is required for responsibility. Yet if we pass the hard-and-fast line, we get immediately involved in questions of degree, in which we derive no assistance from the charges of judges, who generally content themselves with repeating the received formula, and leaving its application to the jury; while, on the other hand, we cannot quote as precedents the decisions of juries, which in all probability have been determined by considerations which are rejected by the principles of the law. There are, however, two directions in which the rule may be extended whenever we pass away from its strictest interpretation.

Unless we adhere to a perfectly literal construction of the absence of knowledge, which is required according to the statements of the existing law, we shall find it very difficult to draw anything like an exact line. Clear knowledge may pass, by almost imperceptible steps, into entire incapacity. There is no sharp distinction, but only a number of intermediate cases, between the idiot whom no man in his senses would hold to be responsible, and the type of imbecile who has frequently been condemned in the courts. The knowledge which apparently brings one of these cases within the limits of responsibility may be purely verbal in its character. The man may, correctly enough, answer questions as to the nature of crime and its punishment, but it does not follow that he really understands the nature of the one or realises the other. In the same way, we may have states of mental confusion which do not amount to entire incoherence, and which may not entirely exclude the ideas of crime and punishment, but in which knowledge is so dim and uncertain that it exerts no practical effect. In all such cases it seems a fair enough construction of the law, that we should not demand proof of the complete absence, in every sense, of the knowledge which is required for responsibility, but that it should be enough to show that the knowledge possessed by the accused was of a kind and quality wholly different from that possessed by ordinary men.

In another way, also, the existing rule may possibly include more cases than are usually supposed to fall under it. It must be remembered that what we have to look to is the state of knowledge at the time of the act. Now, it seems in some instances certain, and in others probable, that in the extreme phases of excitement which occur in insanity, the knowledge of the nature of an offence and its punishment, although more or less plainly present to the mind before and after the act, may be wholly absent from consciousness at the time of its commission. Criminal acts seem occasionally to be determined by an impulse so sudden, that there is absolutely no time for realising the nature of the act and its consequences. In other cases the act represents the crisis of an ascending movement of feeling or passion, which probably in the end wholly excludes from consciousness everything but the immediate motive to action. In some cases characterised by melancholia, for instance, it seems likely enough that the crime is the result of feeling so intense in its nature, that it excludes all possible consideration of the consequences of the act. In other cases we seem to find a state resembling somnambulism, in which the mind is entirely dominated by a certain chain of ideas from which it cannot escape, and in other respects is entirely vacant. Occasionally we find a crime committed under the influence of a violent and uncontrollable burst of insane passion, which, especially in combination with a dull or weak intellect, may entirely obliterate the consciousness of criminal action. All such cases would unquestionably be very difficult to prove, but there is no theoretical reason why in them insanity should not be admissible as a defence under the existing law. They do not stand in the same position as temporary phases of excitement and passion in the case of sane men, for in these latter instances society cannot admit that a man may be excused on the ground of a liability to passion or excitement which he ought to have controlled and corrected.

Although, however, a large number of cases fall within a liberal construction of the existing rule, there are many strongly marked phases of insanity which are excluded by it. In many instances, for example, the accused knows quite well that he is committing an offence against the law, for which he may be punished, but regards the act as a right or duty, or as a simple necessity. It may appear to him the only means by which he can obtain redress for his imaginary wrongs (as in the cases of Bellingham, Macnaughton, and M'Clinton); or, like Martin and many others, he may consider it to be done under a command which superseded all human commands; or, as in the case of many melancholics, it may present itself to him as the only means of escape from some greater impending evil. Occasionally, the very motive for the crime is the desire of dying at the hands of the law. There are many instances in which crimes are deliberately committed under the influence of insane ideas like these, and all of them fall clearly within the existing limits of responsibility. Persons so affected are treated (in theory at least, for a jury rarely carries the theory into practice) in exactly the same way as sane men who are urged by some fanatic impulse, or who avenge their own real or imaginary wrongs. At the best, the law regards their delusions in the same light as sane errors in fact. In other instances, the criminal act is committed under the influence of some violent feeling or passion. Some of these cases may, as we have seen, be brought under the existing law, because it seems at least probable that at the time of committing the act the perpetrator was unconscious of its criminal character. But that is not always so. In many cases of this nature it would be a straining of the law to say that the act was done through defect of knowledge. The defect in such cases lies not so much in the incapacity for knowing, as in the want of capacity for deliberate action, and in the strength of the insane motives.

There are thus a large number of insane criminal acts to which exemption from punishment is not accorded by the present rule of law, because it takes no account of the effect of insanity except in so far as it disables the subject from knowing the legal meaning of his act. Everything else that affects the determination of action—the delusions which distort the moral aspect of the act, the defective power of deliberation and control, the abnormal influence of the idea or feeling—is wholly rejected from consideration. The question, however, arises, how far it is really consistent with the theory of the law to exclude these elements from consideration? The principle from which Hale started on his exposition of the law was, that when there is no free choice of the will there is no crime; and that principle in various forms is too plainly the fundamental assumption of every criminal system to require discussion. But what happened after Hale is what has happened frequently enough in the professional development of the law. The general principle passed out of sight, because it was too general and looked too philosophical for common use; the subordinate rule (although really founded upon an opinion as to matter of fact) obtained an independent existence, and became the ultimate ground of appeal. What we have now to do is to go back to the general principle, and see whether there is not any change of view as to the class of cases which ought to fall under it.

We have practically discussed this question in a previous article, while sketching the leading features of the psychology of the insane. We put aside the motive of freewill in its technical sense, as an idea which belongs to metaphysics and not to law. What we have to deal with is that practical idea of being able to choose between our possibilities of action, of the capacity to obey the law from whatever sanction, which is sufficiently familiar to us in ordinary life, however difficult it may be to put it in theoretical form without becoming involved in metaphysical questions.

It is this practical conception of the power of free action which forms the basis of the criminal law; and the question we have before us is one strictly of fact—whether the only effect of insanity which disables free choice, and renders the subject unable to obey the law, is incapacity to know the penalty which attaches to the act? In the case of sane men, we admit no ground as relevant to infer irresponsibility except the absence of knowledge and criminal intention, partly for reasons of expediency, partly because we do not believe that in their case the conditions of self-control are ever completely absent. At the time the present law was fixed, men believed that these reasons applied equally to insanity. No one supposed that an insane man, who transacted his ordinary affairs and knew what he was doing, could not have restrained himself if he had pleased, and therefore he was put in the same category as criminals who were actuated by violent passion or extraordinary malice. But there is nothing in the theory of the law to prevent other elements besides that of knowledge from being taken into consideration. If the will be wholly overborne by insane feeling or passion, or if deliberation and control be rendered impossible by reason of weakness of faculty, or by the overmastering power of some morbid idea or impulse, the man is quite as unfree as if he were acting under physical compulsion, and there is no reason why the law should not acknowledge the fact. In reality, such cases were not taken into account, simply because lawyers did not believe in their existence. The apparent depravity and passion of the insane did not appear in their eyes to differ materially from those of sane men, and it did not therefore seem to them that there was ground for treating them differently because they had sprung from disease instead of from natural disposition or education. In all the so-called cases of partial insanity, they severed the insane phenomena from the rest of the mental life, and regarded the morbid idea or impulse as a mere incident attaching to an otherwise sane personality, which might have resisted and overcome it. But these are matters of fact which fall to be determined, not by the assumptions which we apply to the conduct of sane men, but by investigation of the actual conditions of insanity. If a man, through disease, is rendered incapable of free action, it matters nothing, so far as the theory of the law is concerned, in what mental form the disease has affected the mind.

In order, therefore, to give fair scope to the principle on which the idea of responsibility is founded, we must take into account, not merely the absence of knowledge, but those other phenomena of insanity by which the will is affected. If we exclude entirely from consideration the diminished power of control and the abnormal force of motives, which form such conspicuous elements of the insane character, we must necessarily take an exceedingly partial and inadequate view of the manner in which action is determined by the morbid mental conditions. In some instances the will seems hopelessly fettered by mental conditions, which, as the law at present stands, must be wholly disregarded. But such cases rarely arise in a perfectly pure form. We find generally a complication of causes through which the will sinks below its normal freedom of action, and some of these are recognised by the law and others are not. Strong insane motives act concurrently with imperfect or confused knowledge and with weakened power of control. We cannot completely distinguish these separate factors, but we know that they exist, and our estimate of the case is imperfect unless we take them all into account. A criminal act may be inevitably determined by conditions of mental disease, but if we strictly follow the present law, we may be compelled to leave out of sight those elements of the case which are really of greatest importance, and which most distinctly mark the nature of the act. In a case like Macnaughton's, for instance, we might find it difficult to admit that the delusions of persecution, in so far as they merely obscured and distorted the nature of the act, formed a sufficient excuse. A sane man might conceivably be possessed of ideas which were equally misleading and unfounded. But the delusions of Macnaughton differed from the false ideas of a sane man, not merely because they prevented him from seeing the true nature of his act, but because they pressed upon him with a force that rendered deliberation or resistance impossible. The jury perceived that he was in a position quite different from that of a sane man who was firmly persuaded of a false opinion, and they therefore acquitted him, although, if they had analysed the case and strictly followed the law, they must have thrown out of account all those elements of madness which so materially influenced their judgment. So also in the case of a murder committed by a man like Hadfield, who supposes that he is acting under divine command, there may be as little rational ground for the crime as in the case of a murder committed by a fanatic, and the one man may be as firmly convinced as the other that he is committing an act which is in accordance with law in its highest sense; but the insane idea which governs the madman, although it does not obscure the legal character of the act, is of a different quality and force from the mere false opinion, and can neither be corrected nor resisted. In those numerous instances in which a crime is committed under conditions of insane passion or feeling, we often find that, although the act may appear to the accused to be morally justifiable, he is nevertheless quite aware that it will subject him to the penalty of the law; and therefore, if we take no other element than this into consideration, the act does not seem to differ materially from some crimes which are committed under similar incentives of feeling by sane men. The real difference only becomes fully apparent when we take into account, not merely the extent to which the man's knowledge of the character of the act has been affected by disease, but the intensity of the feeling which urged him into action.

In short, in almost every case of insanity, the element of knowledge is not the only, nor always even the most important, factor to be taken into account in determining whether an act can in any sense be said to spring from "the free choice of the will." That this is so has been attested by the authority of every one whose opinion on the subject is entitled to weight. And if we look at the change which has taken place since the older cases, we shall see that a wider view has commended itself even to the popular intelligence. No one would now affirm that Arnold and Bellingham were rightly convicted; nor would any one now think of condemning the acquittal of Macnaughton, although at the time it raised a storm of hostile criticism. We continually see juries returning verdicts of acquittal in cases which, when strictly examined, appear clearly to fall within the theoretical limits of responsibility; and in many other cases we feel certain that a similar result would have happened had the examination of the case been less hasty and superficial. The rule is an antiquated one, as nearly every rule of law must be which implicitly settles a matter of fact on the basis of the popular opinion of two centuries ago. It is now neither in accordance with expert knowledge nor with enlightened common sense, and it is only tolerated because it is applied, not in strict legal fashion, but by jury verdicts.

We must conclude, therefore, that the limits within which the defence of insanity is confined by the existing definition of responsibility are too narrow. There is no good reason whatever why we should take into account only a part of the mental effects of disease, and exclude from consideration other elements of the general result which are at least equally important. Every morbid condition which affects the power of free action is equally relevant, and we cannot rightly appreciate the nature of the case, unless we take it as a concrete whole.

REVIEWS OF BRITISH AND FOREIGN LITERATURE.

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Lectures on Diseases of the Nervous System. Second Series—"Subjective Sensations of Sight and Sound, Abiotrophy and other Lectures." By Sir William R. Gowers, F.R.S. London: J. & A. Churchill.

These lectures, ten in number, have already appeared in print at various times. The first lecture, "Subjective Visual Sensations," deals specially with the visual phenomena of migraine and epilepsy. The author holds, with Ferrier, that a higher visual centre exists in the region of the angular gyrus, and he thinks that these visual phenomena are best explained on the assumption that the higher visual centres are the seat of the disturbance, and that they must, in most cases, depend on a functional fusion of the centres in the two hemispheres.

The second lecture, on "Subjective Sensations of Sound," is specially suggestive as regards the part played by the cerebral centres. Attention is drawn to the evidence of central co-operation in determining the character of labyrinthine sounds in certain cases—a point of importance as bearing on treatment, *e.g.*, on the power of bromide to relieve the symptoms in many cases. Gowers protests against the tendency to exaggerate the frequency of primary atrophy of the auditory nerve in cases of labyrinthine deafness, notably in tabes.

Of special interest is Lecture iii., dealing with "Abiotrophy"—the name suggested by the author for the various maladies dependent on defective vital endurance of tissues. He illustrates this condition by the wasting of the hair follicles which causes premature baldness, by muscular dystrophy, and by many forms of so-called "degenerations" in the nervous system. In neural abiotrophy, the slow decay or "failure to live on" is limited to nerve elements which have a common function; this decay is always accompanied by an overgrowth of the interstitial neuroglia, and this, when started, may acquire independent energy, and the prominence of the "sclerosis" often obscures the fact that the wasting of the nerve-elements is the primary change. Lecture iv. deals with "Myopathy," an example of muscular abiotrophy; it is regarded as a purely muscular disorder. Great emphasis is laid on the importance of voluntary muscular exercise as the one and only agent which can hinder the failure of muscular strength and nutrition.

Three cases of myasthenia are described in Lecture ix., and special attention is drawn to two symptoms—(1) The "nasal" or "levator" character of the smile, and (2) the special features which distinguish the ophthalmoplegia from that seen in nuclear degeneration. Stress is laid on the fact that the distribution of many of the symptoms of myasthenia corresponds more closely to that met with in idiopathic muscular atrophy than to known affections of the nervous system.

Lectures vi. and vii., "Syphilitic Diseases of the Nervous System" and "Inevitable Failure: a Study of Syphilitic Arterial Disease," enunciate the most important general principles which give guidance in prognosis and treatment of specific nervous lesions. In Lecture viii. three cases are described, which are believed, on clinical grounds, to be "sufficiently suggestive to warrant the pathological conception of hæmorrhage into pre-existing cavities in the spinal cord"—*syringal* hæmorrhage.

The remaining lectures deal with "Metallic Poisoning" (Lead and Arsenic) and "The Use of Drugs."

The whole series of lectures is admirable, as well in substance as in treatment. Each is marked by the simple clearness of expression peculiar to the author, and by his wonderful power of analysis and of reading important lessons from the smallest details. They are eminently suggestive and calculated to stimulate readers to a more careful study of some at least of the many problems dealt with.

Ashley W. Mackintosh.

Diseases of the Nervous System. By Prof. H. Oppenheim. Translated from the Third German Edition by Dr. E. Meyer. London: J. B. Lippincott Co.

This is the second edition of a translation of Professor Oppenheim's well-known book. The latter has reached a third edition in its author's own country, and is recognised there as a standard work. The latest investigations have been incorporated in this new edition, and these have added about fifty pages to the book. It is divided into two parts—a general and a special. In the first, the methods of examination and general symptomatology are described, while in the second there are six sections devoted respectively to diseases of the cord, of the peripheral nerves, of the brain, the neuroses, diseases of the sympathetic, and toxic conditions in which nervous symptoms predominate. This is somewhat of a cross division, but it is convenient and is satisfactory for grouping. In the case of some diseases whose precise seat is not yet fully known, the grouping is with those which most closely agree with them in their main features.

Considerable space is devoted to the description of the methods of investigating a case of nervous disease, and, for obvious reasons, this is most desirable. A correct diagnosis is dependent on this. A complete but not minute account is also given of the anatomy, physiology, and general pathology of the various parts of the nervous system. This description contains most, though not all, of the recent advances in this direction, but in this he exhibits a quality which is apparent throughout the book. He is cautious in accepting new opinions, and seemingly prefers to take his stand on facts already well established.

In the first section, tabes naturally occupies the first and most important position. As to its etiology, while acknowledging the influence of syphilis, he states that it is "not a syphilitic disease in the pathologico-anatomical sense." As to its pathological anatomy, he adopts the view that the chief alteration is the grey degeneration of the posterior tracts.

It begins in Burdach's column, usually in the upper lumbar segment. He further states, that in his opinion the origin of the process is in the spinal ganglia and their homologues. He, however, admits the possibility of a more peripheral origin.

In the section in which diseases of the brain are described, a good deal of space is devoted to the question of aphasia. The subject is not only exceedingly interesting in itself, as it affords information with respect to mental processes, but it is important as a means of localising a lesion. Seven varieties of aphasia are given, with the characteristic symptoms of each, both negative and positive. Attention is also rightly directed to the fact that individuals vary in the prominence of different factors in their speech processes. In some, auditory impressions occupy the most important position; in others, visual or motor may be in the forefront. This makes it necessary to exercise great care in interpreting the phenomena in different cases. There are many other interesting points in this section to which attention might be directed. Suffice it to say that they are, on the whole, very satisfactorily treated. So-called mental diseases are referred to in this section, and, as is to be expected, are, with the exception of general paralysis, not treated with any fulness. Of the remainder of the book little need be said, except that it comes up to the high standard of the previous parts.

The translation reads well, and it may be added that Dr. Meyer has in many places inserted valuable notes giving information not furnished in the original.

JAS. MIDDLEMASS.

The Medical Inspection of School Children. By W. LESLIE MACKENZIE, M.A., M.D., assisted by EDWIN MATTHEW, M.A., M.B. Edinburgh and Glasgow: Hodge & Co.

THIS book is written with the object of embodying the recommendations of the recent Royal Commission on Physical Training in such a form as to combine the services and the interests of the school manager, the teacher, and the doctor, in the work of the medical examination of school children. It is at once a practical guide for the pedagogue, a text-book for the medical inspector, and a plea for the necessity of organised and methodical medical examination. The work is divided into three parts —(1) The object, form, and organisation of medical inspection; (2) the practice of medical inspection; (3) school anthropometry. Under the first head, there is an excellent chapter on "what the teacher can do to assist in medical inspection," and one on "the organisation of medical inspection." Dr. Mackenzie favours the employment of the medical officer of health for the county as the head of this organisation, and anticipates the amalgamation of the School Board area with the county, as is proposed in the Scottish Education Bill now passing through Parliament. On this point he says (p. 125): "The public health authority should remain paramount; it should have the main direction of the medical inspection of school children. . . . If school and public health authorities are to become identical, all difficulty of organisation disappears. . . . The proposed medical inspection of school children is therefore best regarded as an extension of the present public health inspection of schools." The second part, dealing with the practice of medical inspection, is the largest and most important in the book. Besides social and racial considerations, there are chapters on antenatal nurture, and on the effects on the health of children of soil and climate, housing, occupation, and food. Following these are chapters on nutrition and growth, as evidenced by height and weight; on the immediate environment of the school; on the examination for mental capacity, etc. The remaining part of this section is devoted to a somewhat detailed programme for the methodical examination of the various bodily organs, commencing with the teeth and ending with the nervous system. The third part is concerned with school anthropometry, and describes the various instruments for that purpose and their use. The inclusion of this subject requires no apology, as Dr. Mackenzie seems to feel it does. On the contrary, it is perhaps, looking to the science of the future, the most important of all. As regards the book as a whole, it is the first important systematic treatise on the subject that has yet appeared. It is ably written, if perhaps hurriedly constructed, and appears to have omitted nothing that is of essential use. It cannot be said that it is either interesting or easy reading, but it bears everywhere the guarantee of genuine authorship, originality, and accuracy in detail.

JOHN MACPHERSON.

Materia Medica, Pharmacology, and Therapeutics. By C. D. F. PHILLIPS, M.D., LL.D., etc. Third Edition. London: Longmans, Green & Co.

THIS well-known text-book has now reached the third edition, and the first volume has been published. It deals chiefly with the inorganic substances, but in addition the varied uses of water; and the use of light and radiant heat are included. Another volume is in course of preparation. Though written on the old lines, this may be considered virtually a new book. The author tells us that every page has been carefully revised, many entirely rewritten, and much new matter introduced. Thus the action of radiant heat, light, and the open-air treatment of consumption are now discussed, while newer drugs, such as the glycero-phosphates, cacodylates, etc., are also included. The revision of the older drugs has been most successfully accomplished, and Dr. Phillips is to be congratulated on the highly satisfactory result. By some minor alterations in the type, and by a rigid elimination of matter which has become out of date, the book has been thoroughly modernised, and in its present form represents the most modern views on pharmacology and therapeutics. The literature has been systematically studied, and throughout the text there are numerous references to original articles, or to the abstracts published in British periodicals.

Special praise must be paid to the descriptions of the therapeutic uses of the various drugs. These are very fully gone into, and contain many valuable observations. Though due respect is always paid to the opinion of others, the author constantly draws upon his own experiences to check these claims. This is particularly noticeable in the articles on arsenic, iron, and sulphur. A special feature is the lengthy article on water. It commences with a detailed description of the various methods of hydropathy, and then there is an excellent account of the different mineral waters. Finally, all the most important spas are briefly described. For the ordinary practitioner, who as a rule is not well up in the characters of the different spas, such an authoritative statement is of great value.

At the end of the volume there is an exhaustive index to remedies and diseases. This is unusually full, and is certain to prove very useful. We can confidently recommend this book. F. J. Charteris.

Lectures on Clinical Psychiatry. By Professor E. Kraepelin. Translated by Dr. T. Johnstone. London: Baillière, Tindall, & Cox. 1904.

This translation of Professor Kraepelin's Clinical Lectures forms a most excellent companion to his Text-Book. It consists of thirty lectures, each of which is devoted to some clinical type of mental disease, and is illustrated by several cases. The nearest approach to it in English is Dr. Clouston's well-known book, but there is a great contrast between them in the matter of classification, and, further, Kraepelin's does not give a complete exposition of the subject. From such clinical lectures, however, in default of actual clinical demonstration, a fairly clear picture of a case can be obtained, and such a picture is necessary, if one is to understand the new classification associated with Kraepelin's name.

The translation has been fairly well done, though in some instances due care has not been exercised in giving the exact term which should be used in English. This is most apparent with respect to the word imbecility, which is sometimes used instead of dementia, and sometimes in its proper sense. The style is not free of the suggestion that it is a translation, but in a book of this kind complete success in this direction is very difficult to obtain. James Middlemass.

NOTES ON BOOKS.

We have nothing but praise for the small work on *Gynæcological Nursing*, by Netta Stewart, Sister in the extra-mural gynæcological wards of the Royal Infirmary, Edinburgh (Oliver & Boyd, Edinburgh, 1903). It bears the imprimatur of Sir Halliday Croom, whose practice it largely reflects, and we are sure he does it no more than justice when he says that it "brings credit to the nursing school to which the authoress belongs." The work is directed entirely to nurses, and their duties are clearly and forcibly defined, no detail being too trivial to be passed over. The first chapter refers to the nurse's duties towards a patient who is to undergo a gynæcological examination; then follow sections on the use of the vaginal douche, the vaginal plug, blistering, the use of the catheter, and the washing out of the bladder. The writer throughout takes pains to impress upon those she addresses that they are nurses and not doctors, and clearly defines the sphere of their work. The remaining chapters refer to operations, with special reference to aseptic and antiseptic technique. We can confidently recommend this work as a text-book for nurses on the branch of surgery with which it deals.

This is by far the best book, *Elements of Kellgren's Manual Treatment*, by Edgar F. Cyriax, M.D. (John Bale, Sons, & Danielsson Ltd., London), that has appeared in English on the subject of Medical Gymnastics and Manual Treatment. The work is very thoroughly done; indeed, the amount of detail contained in the volume is almost bewildering to any reader who is not already acquainted, to some extent, with the practice of this form of treatment. For practical purposes, one-half, or even a third, of the various movements would have been quite sufficient. The multiplication of proposals, which in essence differ but little from one another, has a confusing effect, and hinders rather than helps the practitioner when dealing with the claims of an individual case.

Dr. Cyriax has divided his book into two portions, the one describing the various exercises themselves, the second dealing with diseases in which these movements are applicable, and giving records of cases and details of treatment. The numerous illustrations enable the reader readily to follow the text.

We have received Vol. i. of the *Transactions of the Society of Anæsthetists*, which contains interesting articles on the "Relation of

Anæsthetics to Shock," by Dr. Joseph Blumfeld; "Somnoform," by Mr. W. Foster Cross, and "Vagus Inhibition from Chloroform," by Mr. H. C. Crouch.

We presume there must be a demand for such books as *Golden Rules of Anæsthesia*, by Dr. R. J. Probyn-Williams (John Wright & Co., Bristol), but we cannot imagine any class to whom they can be both necessary and helpful. That the author is well qualified to lay down rules for the administration of anæsthetics his larger work amply testifies, and we commend it, rather than his present venture, to our readers.

Dr. Herbert French's *Medical Laboratory Methods and Tests* (Baillière, London) will prove a useful guide to practitioners who desire the aid of modern chemical and microscopic examinations of excreta, blood, pus, etc. The directions are short, clear, and practical.

The Bacteriology of Everyday Practice, by Dr. J. Odery Symes (Baillière, London) appears in a second edition. It has been brought up to date by the addition of sections on the preparation and staining of blood films, meningitis, trypanosomiasis, influenza, and diseases of the alimentary canal.

Dr. E. G. Younger's contribution to the "Medical Monograph Series," on the *Insanity in Everyday Practice* (Baillière, London), should prove useful to those who in general practice seldom meet with cases of insanity, but who may any day be called upon to deal with a patient suffering from mental aberration.

It is only necessary to chronicle the appearance of a fifth edition of Dr. J. Scott Riddell's *Manual of Ambulance* (Charles Griffin & Co. Ltd., London). This work has already made its reputation, and the new issue can only enhance it and ensure it a renewed lease of life.

We also note the appearance of a second edition of Major J. J. de Zouche Marshall's *Stretcher Drill*, which is compiled from the *Manual of the R.A.M.C.*, 1904, and other official manuals.

We have learned nothing by the perusal of Dr. G. W. Overall's *Non-Surgical Treatise on Diseases of the Prostate Gland and Adnexa* (Rowe Publishing Co., Chicago).

Dr. H. B. Grimsdale has published a course of *Elementary Lectures on Errors of Refraction and their Correction* (Medical Times Ltd., London). The matter is clearly and succinctly set forth, but is printed on such bad paper and in such small type that the book is calculated to produce in its readers the very errors it professes to teach them to correct.

RECENT ADVANCES IN MEDICAL SCIENCE.

MEDICINE.

UNDER THE CHARGE OF

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Clinical Methods and Diagnosis.

Alimentary System.—*Weber's blood-test in latent gastric and intestinal hæmorrhage* (Hartmann, *Arch. f. Verdauungs-kr.*, Berlin, 1904, Bd. x. Heft 1).—On the addition of guaiac and turpentine to an ethereal extract of gastric contents or fæces, after treatment with glacial acetic acid, a blue colour is struck if hæmatin be present. In performing the test, care must be taken not to contaminate the glasses or reagents with sweat from the fingers, which gives a spurious reaction. The chief drawback to the test is its great delicacy. The eating of raw or even cooked meat or fish leads to the appearance of blood pigment in the stools, while, as regards the gastric contents, even the gentlest passage of a stomach tube is apt to cause slight bleeding from the mucous membrane. The test is therefore most applicable to the fæces, and when it is being employed the patient must be put on a diet free from flesh for the three preceding days. In gastritis with deficient acidity, hyperacidity, and neurosis of the stomach, blood is never present in the motions. In all cases of gastric ulcer the reaction is positive. Hartmann emphasizes the fact that, while in some cases the reaction is only occasional, in others it is constant. The latter were for the most part chronic ulcers, many of which gave rise to no gastric symptoms, in persons suffering from intractable anæmia due to the repeated small hæmorrhages. The author followed up these patients, and found subsequent evidence (hæmatemesis, etc.) of ulcer in so many, that he now believes that this symptom—persistent positive Weber's reaction in the fæces—is a characteristic sign of latent ulcer. Latent hæmorrhage is very constant in carcinoma; indeed, negative Weber almost excludes the disease. It may, however, be absent in non-ulcerated scirrhous cancer. The following rule may be laid down:—Absence of free HCl, along with retention of the motor power of the stomach, and constantly positive Weber's test, point so strongly to cancer as almost to exclude a benign lesion. The point as to motor power must be borne in mind, since interference with this, apart from cancer, often causes latent hæmorrhage. Hartmann found blood in the fæces in all his cases of simple pyloric stenosis. His conclusions are briefly—(1) Positive Weber is only of diagnostic value if the patient is on a flesh-free diet; (2) it is of little value, so far as the gastric contents are concerned; (3) latent bleeding does not occur in gastric neurosis; (4) the test of great value is the detection of round ulcer; (5) latent hæmorrhage occurs in simple and malignant gastric insufficiency; (6) positive Weber, with absence of free HCl and retention of motility, is highly suggestive of cancer.

On sounding and radiography of the large intestine (Schüle, *ibid.*, 1904, Bd. x. Heft 2).—The observations were made by passing a flexible bougie into the rectum, and then by radiography ascertaining the course it took. In most cases Schüle found that it simply coiled up in the ampulla; in the few in which it went higher, he found that it did not pass beyond the sigmoid. He never succeeded in passing it into the descending colon; the diagnosis of an obstruction above the rectum by means of a sound is therefore impossible. He says that where a sound can be passed painlessly to any length, it is probably coiling up in the rectum, as he always found that when it passed higher the force required caused considerable discomfort. Another series of experiments were made to ascertain whether high irrigations of the colon are practicable. Using a mixture of 250 grms. of bismuth in 400 c.c. of oil, and injecting it with the patient in the knee-elbow position, he could map out the whole colon to the ileo-cæcal valve (beyond which the injection never flowed) by radiography. This seems the only really valuable means of determining the course and position of the colon, it being much more accurate than ballooning with air or distending with fluid.

Delimitation of gastric boundaries (Sievert, *ibid.*, 1904, Bd. x. Heft 4).—The method employed was to evolve CO_2 in the stomach by giving a carbonate and an acid, and the questions proposed to be solved were —(1) How far the percussion limits of the stomach, distended with a small quantity of CO_2, agree with its boundaries as determined by other methods (abdominal palpation for splashing, ordinary percussion, and auscultation percussion with the phonendoscope); (2) what differences are got according as large or small quantities of gas are used; (3) whether the stomach enlarges uniformly in all directions, or is dislocated when over-distended. The practical outcome of the observations confirms the value of the distension caused by the evolution of the small quantity of CO_2 produced by swallowing 1 grm. of tartaric acid and 2 grms. of sodium bicarbonate, as affording evidence of the true size and position of the stomach. Not only the lower, but the right, and if the stomach be displaced down, the upper border can be detected by this method. The position of the right border is highly important in the diagnosis of the early stages of gastriectasis. Contrary to the statements of others, Sievert has not found that the CO_2 tends to escape through the pylorus of an empty stomach; the observations can therefore be made in the fasting condition. The boundaries of the stomach, as estimated after distension with large quantities of gas, are not the true ones, but those of a dilated and dislocated organ. The artificial dilatation is not uniform, but most toward the right and downwards.

The test with a large quantity of gas is of value only in gastroptosis, to show clearly the position of the displaced organ.

Diagnostic significance of the tenth rib (Rubinstein, *St. Petersb. med. Wchnschr.*, 1904, February 21.—The question discussed in this paper is the relation of a floating tenth rib to gastroptosis. It has been asserted by Stiller of Budapest, and others, that the condition is a stigma of congenital asthenia, which shows itself by visceral ptosis, neurasthenia, and atonic dyspepsia. Rubinstein, after a résumé of the facts, concludes, from a series of observations on patients, that though a floating tenth rib occurs in many healthy persons, it should be looked upon as a finger-post indicating the probability of ptosis of the viscera, and its accompanying neurasthenic symptoms.

URINARY SYSTEM.—*Ureteral catheterism and the diagnosis of renal function.*—Under this title Kapsammer (*Wien. klin. Wchnschr.*, 1903, December 17) deals with the question, whether under normal circumstances, as Casper and Richter maintain, the excretion of both kidneys at any one time is identical. He thinks that the alleged risks of catheterisation of the ureter have been much overrated; in skilled hands the danger of injury is no greater than in ordinary catheterisation, and the possibility of infection can be minimised by sterilising the instruments and by a prophylactic instillation into the ureter. The latter he warmly extols as allowing of the absolutely safe sounding of the ureter in cases of bladder disease; the ureter is quite insensitive to 2 per cent. nitrate of silver or 1 per cent. sublimate solution. His researches on the physiological excretion of urine were made on ten persons; he first collected enough urine simultaneously from each ureter to allow of cryosocopy, then injected phloridzin, and, as soon as glycosuria appeared, methylene-blue. By estimating the amount of fluid in the bladder before and after each experiment, it was ascertained whether any was flowing down by the side of the catheter. As an example of his results, the following may be taken:—Freezing point: left kidney, – 91°; right, – 1°·23. Glycosuria: left kidney, appeared fifteen minutes after injection of phloridzin; right, twenty-five minutes. Both kidneys excreted about the same quantity of urine during the first half-hour, though the molecular concentration was quite different. Over the whole observation, lasting one hour thirty-five minutes, the left kidney excreted more urine, but of lower concentration; sugar appeared earlier, but less abundantly, than in the case of the right kidney. Methylene-blue was also excreted to a less extent by the left kidney. In seventeen out of twenty-one experiments the quantities excreted by the two kidneys were unequal. In eleven observations (all those made) the lowering of the freezing point was never equal, the greatest difference being 0°·33. Glycosuria developed simultaneously on both sides in seven out of ten cases; the percentage excreted was equal in only five of these. A number of experiments on dogs gave confirmatory results. Kapsammer's observations certainly seem to justify his conclusion, that two normal kidneys excrete dissimilar urine in the same period of time. As a rule, one permanently excretes more than the other, and an alteration in this respect is exceptional. Such facts, while they do not destroy all ground for basing a diagnosis of the kidney function on ureteral catheterisation, show that one must not lay undue stress on slight absolute differences in the urine. Possibly the fact that pyelitis, due to ascending infection from the bladder, is generally unilateral, may depend on differences in the amount and quality of the urine excreted on the two sides.

In a paper on the same subject—"Ureteral catheterisation, Urine Separation, and Cryoscopy"—Lower (*Med. News*, Phila., 1903, December 19) concludes that—(1) Before operating on a kidney the presence of a second functionating organ should be established, the best and safest means of doing this being by cryoscopy and ureteral catheterisation. (2) The function of the kidney is best determined by (*a*) cryoscopy of the urine; (*b*) phloridzin glycosuria; (*c*) the amount of urine excreted; and (*d*) cryoscopy of the blood. These tests are arranged in order of importance.

Zangemeister (*Berl. klin. Wchnschr.*, 1903, December 7), in a paper on "Cryoscopy of the Urine," gives as two sources of error—(1) The fact that in parenchymatous nephritis the inability of the kidney to excrete excess of water may result in a urine whose molecular concentration is above normal; and (2) on diluting different samples of the same urine prior to cryoscopy, the freezing point does not rise proportionately owing to the dilution splitting up saline molecules into ions, which function as separate molecules, and thus simulate a greater molecular concentration than really exists. The first fallacy can be detected by noticing the degree of molecular variation which can be produced by drinking large amounts of water, and the second avoided by diluting freely, say with 5 to 15 volumes of water.

SURGERY.

UNDER THE CHARGE OF

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On the Sterilisation of the Hands.

A most exhaustive investigation on the subject of the sterilisation of the hands for surgical purposes has been carried out by Mr. Charles Leedham-Green (*Birmingham Med. Rev.*, 1904, April, May, June). The various methods advocated by different authorities have been subjected to a series of searching tests, and the results obtained are most interesting. We confess to a feeling akin to despair awakened in us by a perusal of the results of the author's experiments, which seem to prove that no one of the methods we have hitherto employed are in the least degree efficacious in rendering the hands sterile. The paper is too long for detailed analysis here, and we must rest content with stating some of the author's conclusions:—(1) Even after the most prolonged and energetic washing of the hands in soap and hot water, it is not possible materially to diminish the number of microbes on them; and this holds good whether sea-sand, marble-dust, or Schleich's soap be employed. (2) There is no advantage in unduly prolonging this washing process, as the hands never become sterile, and, owing to the loosening of the epidermis, generally appears more infected after than before the washing. No advantage is offered by the use of soft soap, or soap containing an excess of free alkali. (3) The water should be used as hot as it can be borne, and should be frequently renewed. After washing, the hands may with advantage be rubbed with a dry, rough, sterile cloth, to assist in the removal of the superficial cells of the epidermis. (4) The use of turpentine, benzoline, or xylol during or after the washing with soap and water does not appreciably improve the results. (5) The aqueous solutions of carbolic, lysol, perchloride or biniodide of mercury are practically powerless to affect the micro-organisms situated on the hands. (6) The use of a saturated solution of permanganate of potash, followed by the application of strong oxalic acid (Kelly's method), gives wholly inadequate results. (7) "Sublamin" cannot be compared in efficiency with the alcohol-sublimate method of Fürbringer, which it was introduced to supplant. (8) The combination of an antiseptic like lysol or biniodide of mercury with a soap does not increase the power of the antiseptic, but rather tends to lower it. Such soaps are practically valueless for the cleansing of the hands. (9) Alcohol possesses a remarkable power of sterilising the hands, far surpassing that of all other agents. To obtain the full benefit of the spirit method, it is necessary to employ the alcohol for from four to five minutes. (10) Spirit soap is greatly inferior to plain alcohol as a cleansing agent; and the addition of biniodide of mercury or lysol to this soap does not materially increase its value. (11) The power which alcohol possesses of sterilising the hands is principally due to its property of hardening and fixing the superficial cells of the epidermis; in addition to which it has a marked bactericidal action. (12) Spirituous solutions of antiseptics are markedly superior to aqueous solutions, and the efficiency increases in direct ratio to the percentage of alcohol in the solution up to about 70 per cent., when any further increase in the proportion of alcohol causes a reduction in the sterilising power of the antiseptic. (13) Of all the methods tested, the best results were obtained by the following modification of Fürbringer's process:—(*a*) The hands are first scrubbed for five minutes with soap and very hot water (about 50° C.), the water to be frequently changed—the use of sterile sea-sand as an addition to the nail-brush is an advantage; (*b*) the hands are then rubbed for three minutes with methylated spirit; (*c*) afterwards scrubbed for a minute or two with 70 per cent. sublimate alcohol (1 in 1000); and (*d*) finally rubbed until dry, and polished with a sterile cloth.

The author advises the use of gloves or the coating of the hands with a thin layer of hard paraffin when possible; and lays special stress on the importance of avoiding infection of the hands by handling septic material.

ENTEROSTOMY IN PERITONITIS.

GREENOUGH (*Boston Med. and Surg. Journ.*, 1904, May 19) advocates the employment of direct drainage of the intestine by enterostomy in cases of acute peritonitis, accompanied by paralytic obstruction of the bowels. The obstruction in such cases is due to a combination of causes of which the most important is suspension or paralysis of peristalsis. This in turn is due to toxic influences and distension, in some cases aggravated by infiltration of the bowel wall and adhesions of recent formation. The great advantage of enterostomy is the drainage of the gases and decomposing contents of the bowel. At the same time the surgeon obtains direct control over the intestine for purposes of lavage, and for the introduction of stimulants, nourishment, fluids, and cathartics. In this connection the author quotes the remark of Finney, that the artificial opening should be regarded "more as a mouth than as an anus." In the great majority of cases the enterostomy should be done as a primary operation, and the bowel should be opened at once—a Mixter or, as we should call it, a Paul's, tube being tied into the intestine. The cæcum is the most satisfactory part of the bowel for a primary enterostomy, and the jejunum is to be avoided. Spontaneous closure of the fistula is to be expected, if the opening is made into the cæcum, and if the opening is kept below the level of the parietal peritoneum. An opening in the jejunum rarely closes spontaneously, and necessitates a second operation for its occlusion. The author's statistics show that, by the systematic use of enterostomy in the graver forms of diffuse peritonitis, the number of patients dying on the second, third, and fourth days after operation is reduced.

A Diagnostic Syndrome for Intracranial Syphilis.

Pritchard devotes a paper (*Med. Rec.*, N. Y., 1904, May 14) to an elaboration of the following formula, which, after testing in many hundreds of cases, he has come to rely upon with confidence:—"Given a patient between the ages of 25 and 45, affected with any form of intracranial paralysis, which was preceded by headaches, of nocturnal onset or exacerbation, associated with vertigo and with insomnia, the insomnia occurring during the first half of the night, the paralysis developing during sleep, both headache and insomnia disappearing upon the onset of paralysis—the cause is syphilis." The diagnostic value of this syndrome depends not upon any one, but upon the association of all, of the symptoms enumerated.

Taxis in Strangulated Hernia.

The discussion which followed the reading of a paper on the treatment of hernia by Dr. Horwitz (*Proc. Phila. Co. Med. Soc.*, Phila., January 30, 1904) serves to emphasize the modern tendency to give up the use of taxis in strangulated hernia. The writer of the paper stated his belief that "gentle taxis should be attempted for a period of about ten minutes," and if this fail "another gentle effort should be made to relieve the constricted bowel" after the patient has been anæsthetised. Price does not employ taxis at all, as he "believes that operation is safer than taxis." J. B. Deaver said: "I have often thought it would be safer if teachers of surgery would not teach taxis. I am sure much harm comes from attempting to make taxis. I believe it is safer, in the event of suspected strangulation, to resort to operation immediately.

PREPARATION OF CATGUT.

MOSCHCOWITZ (*Med. Rec.*, N. Y., 1904, May 14) describes a simple method of preparing catgut, on the lines suggested by Cladius. The catgut, just as it is bought from the dealer, is wound, preferably in a single layer, on the spool, and tied at both ends to prevent unravelling. It is then immersed for eight days in a solution of iodine, 1 part; iodide of potassium, 1 part; distilled water, 100 parts. (The solution is prepared by dissolving the iodide of potassium in a small quantity of water, to which the iodine, previously finely pulverised, is added, and the whole diluted to 100 parts.) So prepared the catgut is absolutely sterile, it retains its tensile strength, it is completely absorbable, but lasts long enough to serve the purpose for which it is intended. The additional advantage is claimed for this catgut, that, in virtue of the iodine it contains, it is antiseptic, and will therefore counteract any infection from the hands of the surgeon. It does not produce any irritation of the tissues with which it comes in contact. Any unused portions may be returned to the original solution, and safely used again after the lapse of half an hour. The method is very inexpensive, a gallon of the solution costing only 42 cents.

OBSTETRICS AND GYNÆCOLOGY.

UNDER THE CHARGE OF

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THE RESULTS OF FORCEPS DELIVERIES IN PRIVATE PRACTICE.

BOKELMANN (*Ztschr. f. Geburtsh. u. Gynäk.*, Stuttgart, Bd. xlv. Heft 1) states that in a period of fifteen years he attended 800 cases; 335 (=40 per cent.) being forceps deliveries, as follows:—166 at outlet, 122 in the pelvis, and 47 at the brim. Further, 238 primiparæ (26 per cent., over 30), 94 multiparæ (=28 per cent.). Bokelmann did not observe any greater frequency of forceps cases in male as contrasted with female children. He thinks it is impossible to carry out the narrow "indications of the school" in private practice, and wait till there is distinct danger to mother or child, before applying the forceps. With regard to maternal injuries he quotes Winternitz, who found that in 331 forceps deliveries in primparous patients, there were thirty-nine complete perineal ruptures, ten urinary fistulæ, not to mention displacements and cicatrices. Again, Wahl, in 332 cases, found complete rupture of perineum six times, and forty-one injuries to vaginal wall. Bokelmann had no such injuries in all the 335 forceps deliveries. He does not think there is any danger to the mother, provided the forceps are skilfully applied. Of his 332 forceps cases, three mothers died; the cause of death being eclampsia in each case. With regard to maternal morbidity, Bokelmann points out the difficulty of contrasting private with hospital cases, on account of the former, in many cases, not being observed during the whole puerperium. But in his forceps cases, as far as he could ascertain, there was only one septic case, which recovered. With regard to fœtal mortality, Bokelmann collected the results in ten kliniks, which gave a rate of from four = 15 per cent. of all forceps cases. But, as he points out, it is important, before drawing any conclusions from those figures, to ascertain if the child was alive before the forceps were applied. Of his own cases, 319 were alive, sixteen died during forceps delivery = 4·7 per cent. Of those sixteen, six were known to be dead before forceps were applied—three doubtful, leaving only seven cases where the children were asphyxiated, and could not be resuscitated after birth. In none of the cases was there any evidence of head injury—and the deaths might have resulted had labour been allowed to end spontaneously. In any case the results are no worse than the general death-rate of all births. Flaischlen (*Ztschr. f. Geburtsh. u. Gynäk.*, Stuttgart, Bd. xlii. Heft 3) gives equally favourable results. Of 200 cases, 160 primiparæ (one-third over 30), forty multiparæ —of these, three died (two eclampsia, one sepsis). Of the children, 201 —189 were born alive; twelve (= 6 per cent.) were still-born. Of these, however, five were dead when the forceps were applied. Of sixty-one old primiparæ, Bokelmann found the infantile mortality = 3·3; while Münchymer in the same class of cases had a mortality of 36·3 per cent. He attributes the latter high rate as being due to delay in applying the forceps.

THE CAUSES OF HÆMORRHAGE IN MYOMATOUS UTERI.

THEILHABER (*Arch. f. Gynäk.*, Berlin, Bd. lxxi. S. 289) has ascertained, from the examination of eighteen cases of fibromyomata, that the endometrium, in cases where bleeding is a conspicuous symptom, differs in no way from that found in cases unattended with hæmorrhage. In the former, however, the connective tissue surrounding the muscular areas is thicker, the blood vessels more numerous and larger, constituting the condition of myofibrosis uteri.

ADRENALIN IN GYNÆCOLOGY.

PETERS (*Frauenarzt*, Berlin, 1904, Nos. 1 and 2) reports very satisfactory results from the use of adrenalin in pruritus vulvæ and acute vulvitis. In two cases, which resisted all other applications, a cure was obtained by applying for four minutes a pad soaked in 1 to 2000 solution of suprarenin. He next applied a weaker solution, the result being immediate and permanent.

THE CHANGES IN THE UTERINE MUCOSA ASSOCIATED WITH EXTRA-UTERINE PREGNANCY.

CAZEAUX (*Ann. de gynéc.*, Paris, 1904, February) considers this question under three types of case—(*a*) The mucosa associated with a growing ectopic gestation. This was carefully examined in two fatal cases. In both, the changes in the mucosa differed very considerably from one another. Cazeaux thinks the reaction is more marked the nearer the attachment of the ovum in the tube approaches the uterus. The congestion and interstitial hæmorrhages of the hypertrophied mucosa would account for the uterine bleeding in such cases. (*b*) In cases of hæmatosalpinx associated with ectopic gestation, Cazeaux found changes in the uterine mucosa exactly resembling those in chronic glandular endometritis. (*c*) Decidua expelled in the form of a cast. This event is not necessarily associated with the death of the ectopic ovum. It consists of the altered superficial layer of the uterine mucosa, and, when cast off, its separation takes place through the middle portion of the ampullary layer.

CARCINOMA OF BARTHOLIN'S GLAND.

FRITSCH (*Monatschr. f. Geburtsh. u. Gynäk.*, Berlin, Bd. xix.) reports the following case:—P., 77, complained of a tumour of the vulva of three years' duration. The swelling was the size of a walnut, and gave rise to a profuse fœtid discharge. The growth was of a cauliflower appearance and movable. It was easily enucleated from the right nympha. Microscopically, it appeared to be a papilloma, showing in some places signs of carcinomatous change and originating from the cylindrical epithelium of the duct of the gland.

THERAPEUTICS.

UNDER THE CHARGE OF

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MEDICAL ASPECTS OF RENAL DECAPSULATION FOR THE CURE OF CHRONIC BRIGHT'S DISEASE.

ELLIOTT has analysed the published statistics collected from publications and private correspondence. The classification was difficult, since the particulars are in many cases vague and meagre. He has collected 112 cases which were treated by surgical methods. Out of this number twenty-nine were cases of floating kidney with albuminuria and cylindruria. In this class fixation of the kidney was followed by excellent results, either with or without decapsulation. The urine improved rapidly.

Chronic interstitial nephritis constitutes a group of forty-three cases. Of these fourteen were in the early stages, *i.e.* with unimpaired cardiac hypertrophy and without œdema or uræmic manifestations. Of these fourteen cases one succumbed from exhaustion after the operation. Of the remaining thirteen, ten were symptomatically improved, two unimproved, while one was rendered worse by the operation. There were twenty-nine cases of advanced chronic interstitial nephritis, with cardiac dilatation, œdema, and increasing uræmia. Of these twenty-nine no less than twelve died within a month of the operation, while a further ten died within the twelve months.

Chronic parenchymatous nephritis was represented by thirty-three cases; and of these, thirteen died, twelve were improved, and eight remained unimproved. Seven of the deaths occurred within a month of the operation. Four of the fatal cases showed transient improvement, the urinary output increasing and the symptoms ameliorating. Thus the statistical record for all the cases operated on for chronic nephritis is, total = 76 :—

Died . . .	36	Mortality ratio .	47·36 per cent.
Improved . .	26	,, ,, .	34·21 ,,
Unimproved . .	12	,, ,, .	15·78 ,,
Rendered worse .	2	,, ,, .	2·66 ,,

Thus, adding together the mortality, unimproved and rendered worse ratios, 65·80 per cent. of the cases failed to be favourably influenced by operation. There is no doubt that some cases of genuine chronic nephritis are improved by operation.

Edebohl's theory, that there is an anastomosis formed between the renal and the perirenal vessels has been abandoned, and we must assume that the occasional increase of function following decapsulation is a result of relief of tension within the kidney, following liberation from capsular restraint. Consequently, if any improvement is to result, there must be a condition of excessive intracapsular tension present. It would seem that it is only in parenchymatous cases, before the secondary contracting stages is reached, that a condition of intracapsular tension can exist. In such cases increased excretion of urine and improvement in quality was the rule after operation, but in fully developed cases of chronic interstitial nephritis, operation was most frequently followed by diminished urinary output.

Elliott concludes that the whole class of chronic interstitial nephritis is not adapted for operation, with the exception of the rare combination of an acute nephritis grafted upon a chronic lesion, where the acute process may introduce the necessary element of intracapsular tension.

Parenchymatous cases are more favourable, especially chronic cases in young people which follow acute infective nephritis. The heart must be competent, and care should be taken to determine that the dropsy and diminution in urine are renal in origin and not due to cardiac failure. But, in view of the unfavourable nature of the statistics, the author is inclined to reserve decapsulation for cases bearing indications for mechanical relief. Such indications are furnished by cases of chronic nephritis associated with movable kidney, by non-obstructive suppression of urine, such as develops in certain very acute cases of nephritis, and after trauma, and by cases of severe idiopathic renal hæmaturia and nephralgia complicating nephritis. In cases of acute nephritis, which display a tendency towards chronicity, incision of the capsule, by relieving tension and establishing drainage, may prevent an acute nephritis becoming chronic.—*N. Y. Med. Journ.*, 1904, June 4.

SUDDEN DEATH FOLLOWING THE USE OF SUPRARENAL INJECTIONS IN ADDISON'S DISEASE.

DUBOIS reports a case of sudden death following the hypodermic injection of a glycerin extract of suprarenal gland. The patient, a woman, æt. 41, suffered from Addison's disease. For this she was treated with injections of the glycerin extract. Every second day 2 c.c. was injected directly from sterile glass capsules. The first five injections were well borne, causing no discomfort, while the patient experienced some improvement. On account of the onset of menstruation, no injection was then made for four days. The sixth dose was injected into the anterior aspect of the thigh. The patient immediately turned pale, sat up, vomited, and dropped down dead. All attempts at resuscitation proved useless. Two somewhat similar cases have been recorded by Boinet. In his cases, the patients, suffering from Addison's disease, at first showed some improvement from injections of adrenalin, and then toxic symptoms developed which proved fatal in forty-eight hours. They consisted of vomiting, chilliness, constriction of the vessels of the extremities, general tremor, cyanosis, and cardiac arhythmia followed by paralytic tachycardia. All the three patients were in a state of profound weakness when the injections were commenced.—*Bull. gén. d. thérap., etc.*, Paris, 1904, May 15.

THE EFFECT OF THE NASCENT STATE.

ROBIN made an interesting communication to the Paris Academy of Medicine, regarding the influence of the nascent state on the action of medicines. At the moment of dissociation, the component parts of the medicine are liberated in the nascent form, greatly increasing the therapeutic activity. In this way the maximum of effect is obtained with the minimum of dose. He instances hydrogen peroxide, where the energetic antiseptic action is due to the liberation of oxygen in a nascent form. He points out that it has recently been shown that many salts containing water of crystallisation may replace the water with oxygenated water. Thus, ammonium sulphate, dissolved in hydrogen peroxide, 30 per cent., and dried over H_2So_4 crystallises the crystals containing a molecule of hydrogen peroxide. The crystals have a faint odour of ozone, which is gradually lost on exposure to air, and which is lost on agitating with ether. Similarly, various salts, as sodium sulphate, borax, acetate of sodium and alum, may be made to contain hydrogen peroxide as water of crystallisation. This confers on them very marked therapeutic effects. It is possible to associate with the astringent action of alum the antiseptic action of nascent oxygen, and to cause an antiseptic purge by using the sulphate of sodium. The peroxides of zinc, calcium, and magnesium have recently been introduced as active medicinal remedies, as intestinal antiseptics and cutaneous applications. All these remedies, in contact with the living tissues, liberate nascent oxygen.

Probably various compounds, which are more active than larger doses of their component parts, owe this increased activity to the liberation of their constituents in a nascent form. Thus hypnal is a compound of chloral hydrate and antipyrin. Aspirin forms in the intestine acetic acid and salicylic acid. Rheumatin forms salicylic acid and quinine. Robin has introduced two new remedies which illustrate this exaltation of action in a remarkable fashion. The one is a sulphur iodide and the other is a double iodide of bismuth and cinchonidine. The sulphur iodide, $S_{16}I$, is an easily dissociable body, containing iodine and various allotropic forms of sulphur. In doses of 1½ to 3 grs. it produces excellent results in cases of flatulence due to fermentation. It has only slight action in acid fermentation. It can be used externally instead of iodoform, being cheaper and more active. The other compound, the double iodide of bismuth and cinchonidine, is known as erythrol. It is a fine powder, bright red in colour, insoluble in water and without any odour. It decomposes slowly in the presence of alkalies. A strong disinfectant, it can be used for putrid wounds. It acts as a rapid deodorant. The stimulant properties of the cinchonidine may also be of use. Erythrol is indicated for putrid, indolent sores. After decomposition by the tissues, the red colour is lost and there is left a white residue, disseminated in patches over the wound. Internally it is useful in gastric and intestinal fermentation, and for checking fœtid breath. Robin prescribes it in ¾ to 1½-gr. doses, put up with 2 grs. of precipitated carbonate of chalk in cachets. While the iodide of sulphur acts chiefly in gaseous fermentations, the erythrol compound seems to have more influence in butyric fermentation. Robin has recently manufactured a whole series of double iodides of bismuth and various alkaloids, combining the special action of the alkaloid with the antiseptic properties of the iodine. Thus the double iodide of morphia and bismuth has a stimulating antiputrefactive action on indolent wounds, while at the same time the morphia acts as an analgesic.—Robin, *Bull. Acad. d. méd.*, Paris, 1904, No. 19.

MOVEMENTS OF THE SUPERIOR INTERCOSTAL MUSCLES IN HEMIPLEGIA.

FROM a study of 161 cases of hemiplegia, Clark contends (*Am. Journ. Med. Sc.*, Phila., Dec., 1903) that the sign described in 1895 by Hughlings Jackson—namely, that in ordinary automatic respiration the amplitude of superior intercostal movements is greater on the paralysed side than on the other, while in volitional movements, such as forced respiration, the ordinary law of greater movement of the sound side obtains—is invariably present, without relation to age, character, duration, or severity of the capsular lesion. The double change (over-action on the paralysed side in automatic respiration and the converse in volitional respiration) was marked in some, slight in other cases, but could always be detected by palpation, and often by inspection. The explanation of the phenomenon is the withdrawal of cortical inhibitory control of the respiratory centre on the paralysed side and consequent overaction of the centre, while volitional movements are of course stronger on the sound side. W. G. Spencer has shown that the cortical respiratory inhibitory centre is situated on the temporo-sphenoidal lobe, while the accelerator respiratory centre lies in the posterior part of the sensory motor-cortex. Owing to the course of the fibres from these two centres, the former are more liable to damage in capsular lesions, hence the sign referred to, and hence, too, the observed occurrence of acceleration of respiration in cases of double hemiplegia. The principle underlying the respiratory phenomena may be demonstrated on all muscles bilaterally susceptible of automatic and volitional movements, *e.g.* those supplied by the fifth, seventh, and ninth cranial nerves.

URTICARIA FOLLOWING THE INTRANASAL APPLICATION OF SUPRARENAL EXTRACT.

ROSENBERG reports a case (*Berl. klin. Wchnschr.*, 1903, No. 41) in which urticaria of the skin was observed shortly after the application of suprarenal extract to the nasal mucous membrane. Whether the urticaria was undoubtedly due to the use of this drug, or whether some other factor was at work, it is of course difficult to speak with certainty, but the case is of interest in view of the general employment of preparations of this kind at the present time. The facts are briefly these—The patient was a young woman, æt. 20, who had always enjoyed good health, and had never suffered from any skin affection. She complained of nasal symptoms which suggested the possibility of an accessory sinus affection, and, for the purpose of making a more careful nasal examination, a small piece of cotton-wool about half the size of a pea was soaked in the extract and placed in the middle meatus of the nose. The patient complained that the plug had a disagreeable odour, but Rosenberg himself was unconscious of this. A few hours later she observed upon the body and arms a number of red wheals which gave rise to almost unbearable itching, and which prevented sleep. On the following morning the rash had disappeared. Eight days later the suprarenal extract was again applied in the same way, and with a similar result. On the following morning Rosenberg was able to satisfy himself regarding the presence of the urticaria. In order to see whether the suprarenal solution was the cause of the condition, he again applied cotton-wool to the nose, but on this occasion cocaine was used. The result was entirely negative, no cutaneous irritation following its use. It seems difficult to believe that a few drops of the solution, of which only a small portion would be absorbed, could give rise to this phenomenon.

INSANITY.

UNDER THE CHARGE OF

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COMMISSIONER IN LUNACY FOR SCOTLAND.

IS EPILEPSY A FUNCTIONAL DISEASE?

THE above is the title of an important paper by Dr. Allan Starr (*Journ. Nerv. and Ment. Dis.*, N. Y., 1904, March), who bases his argument upon an analysis of 2000 cases of epilepsy which he himself has personally examined. He first discusses the various types of Jacksonian epilepsy, namely, the motor, the sensory, the aphasic, and the physical—all of which arise from a local irritation of the brain cortex. This local affection may be of many kinds, such as tumours, abscesses, clots, etc. He next draws a parallel between the symptoms of Jacksonian and the so-called idiopathic epilepsy, by means of which it is demonstrated that the only difference between the two lies in the extent of the motor spasm. Proceeding to that group of cases in which epilepsy depends upon mal-development of the brain, the author states that out of 400 cases of idiocy and infantile paralysis, 156, or 39 per cent., were the subjects of epilepsy. When epileptics are carefully studied, it is usually possible to find evidences of some mental or physical signs of degeneracy or of defective evolution, and this is particularly true of those who are affected in infancy or in youth. In such cases the epilepsy is a mere symptom of brain defect. It is a fallacy to state that an epileptic presents no symptoms between his attacks. It is an exception to find an epileptic in a perfectly normal mental and physical condition, without signs of degeneracy or symptoms of some imperfect function; but such symptoms are wrongly interpreted as the cause of epilepsy—they are merely correlated expressions of an underlying condition. With regard to reflex irritations, while not denying that it is our duty to relieve them, the author does not believe that peripheral irritation ever causes epilepsy. He maintains that many cases of idiopathic epilepsy are actually cases of mal-development of the brain, with gross or microscopic defects; that the associated mental and physical signs of degeneracy merely indicate this mal-development; and that, like them, epilepsy is a manifestation of organic disease or defect. A discussion of the supposed causes of the disease leads to the conclusion that, in the cases in which they can be accepted as probable causes, they are so because they have produced organic disease of the brain. The failure to detect this underlying organic disease or defect lies in the fact that each new observer in turn finds some new lesion, or locates the disease in some new region of the brain; but all these observations are worthy of serious attention, for they all demonstrate the existence of gross or microscopic changes in the brain.

THE BLOOD IN EPILEPSY.

THE authors of this paper (Pearce and Boston, *Am. Journ. Insan.*, Baltimore, 1904, April) state that in their experiments they excluded every case of epilepsy where there was known organic disease in the brain or its membranes, or in any visceral organs. Observations were made in seven cases of idiopathic epilepsy as to the number of red and white blood cells present per c.mm., the percentage of hæmoglobin and differential leucocyte counts were made before and after the seizures. In all the seven cases there was a fairly well-marked chlorotic type of anæmia present. In all but one there was a slight leucocytosis. The polymorphonuclear cells were in three of the cases reduced 29, 42, and 43 per cent. respectively; but there was no corresponding decrease in the lymphocytes. The red cells were approximately normal in number, but in all there was a moderate degree of poikilocytosis, and this was especially marked in those cases where the hæmoglobin was greatly reduced. The injection of small quantities of blood from an epileptic human being into a rabbit, produced profound toxæmia in the latter animal. The hæmoglobin rose from 65 to 84 per cent., and the leucocytes from 8000 to 17,000 per c.mm. When the injections were persisted in, the rabbits became very ill, and one of them showed the enormous leucocytosis of 162,800 per c.mm., which, however, fell to 11,800 two days later. In other experiments it was found that before the first injection the leucocytes numbered 9000; twenty-four hours after the injection, 14,000; and fluctuated from 10,000 to 18,000 after each successive injection. During the period of injections the red blood cells fell over 1,000,000 per c.mm, showing a progressive destructive change. These results, say the authors, are in striking contrast to changes noted in the leucocytes in ordinary septic processes, where the polynuclear cells show a decided increase. After each injection eosinophilia developed within twenty-four hours, a change similar to that observed in the blood of persons suffering from such parasitic diseases as trichinosis and filariasis. This would appear to suggest the necessity for more careful observation as to a possible relation between epilepsy and parasitic infection.

THE CHEMICAL FINDINGS IN THE CEREBRO-SPINAL FLUID AND CENTRAL NERVOUS SYSTEM IN VARIOUS MENTAL DISEASES.

THE author (Dr. Isador Coriat, *Am. Journ. Insan.*, Baltimore, 1904, April) gives a detailed analysis of the cerebro-spinal fluid in twenty-nine cases of mental disease. The fluid was obtained by lumbar puncture made from ten minutes to nineteen hours after death. The quantity thus obtained varied from 10 c.c. to 50 c.c., the larger quantity being confined to cases of general paralysis. In only two instances was the reaction alkaline; in all the others it was acid, owing to the presence of lactic acid. A substance which reduced Fehling's solution, and which exactly resembled phenyl-glucosazon, was present in nine cases. The largest amount of proteid was found in ten cases of general paralysis, a case of alcoholic delirium with polyneuritis, a case of alcoholic dementia, and one of organic dementia (tumour). Cholin was tested for in all the cases, and in twenty-one it was quantitatively determined. It was wholly absent in only four cases—alcoholic depression, senile paranoia, melancholia, and senile dementia. In general paralysis, cases with organic disease of the nervous system, and in cases complicated with neuritis, it was always present. Although, on the whole, the largest quantity of cholin was found in cases of general paralysis, there was no connection established between the amount of the substance, the brain weight, and the duration of the disease process. On the other hand, the largest amounts of cholin were, as a rule, found in cases showing the highest percentages of proteid, both being a measure of the extent of destruction in the central nervous system. Cholesterin was not found, but phosphates and sulphates were always present.

DISEASES OF THE EAR, NOSE, AND THROAT.

UNDER THE CHARGE OF
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Hæmorrhage after Removal of the Tonsils.

The subject of hæmorrhage after removal of the tonsils is one of very considerable importance. Although fatalities are not frequent,—at least, the number of published cases is comparatively few,—the risk of a fatal issue is to be feared, and the occurrence of such hæmorrhage is always alarming to the patient. The bleeding may be primary, reactionary, or secondary. It is not, however, a common complication. Bark (*Journ. Laryngol.*, London, 1904, May) has only twice met with hæmorrhage out of 6000 operations performed on children under fifteen years. In both cases the bleeding was severe, but not alarming. In adults, on the other hand, he has had five cases of severe hæmorrhage. In all seven cases the guillotine was used, and in none of them was the anterior pillar of the fauces wounded in any way. Astringents, sprays, and gargles were useless. In five of them, the bleeding was arrested by means of a pad of lint soaked in turpentine or adrenalin, held upon the stump of the tonsil with the middle finger of one hand, while the thumb of the same hand pressed below the angle of the jaw. In two cases in which a spouting vessel was visible the bleeding was controlled by pressure forceps and ligature.

Harmon Smith of New York (*Laryngoscope*, N. Y., 1904, February) discusses the subject of hæmorrhage after removal of the tonsils, and tabulates a list of 54 cases which have been published, but of this number six terminated fatally, thus indicating the serious nature of some of them. Considering the many thousands of cases that are operated upon, it is probable that some special cause exists in those cases in which such a complication arises. Smith enumerates the following possibilities, the hæmorrhagic diathesis, fibroid tonsils—the fibrous tissue preventing the arterioles from contracting—adult life rather than childhood, males more frequently than females, acute inflammation of the tonsils, general anæmia of the patient, and abnormalities in the distribution of the blood vessels of the part. The existence of an anatomical abnormality in the distribution of the vessels in the immediate neighbourhood of the tonsil has been the cause of hæmorrhage in more than one instance. Wounding of the anterior pillar of the fauces has been accountable for abnormal bleeding, and the preliminary application of cocaine and adrenalin raises an interesting question in connection with this subject. The use of these drugs locally is regarded by some as predisposing to reactionary hæmorrhage.

Various remedies have been adopted to control hæmorrhage from the tonsil with varying success. By placing the patient in the erect posture, and thus inducing syncope, the bleeding may be successfully arrested. If the bleeding is evidently proceeding from a single point, it may be seized in a pair of forci-pressure forceps, and, after their removal at the end of a suitable interval, the bleeding point may be cauterised with the galvano-cautery or Paquelin's thermo-cautery. Ligation of a vessel in this situation is not a simple matter. An oozing surface may be successfully cauterised. Direct pressure upon the bleeding stump by means of gauze or lint soaked in a styptic, the pressure being maintained for a varying period of time, may prove perfectly satisfactory. Suturing the anterior and posterior pillars of the fauces over the bleeding tonsil has been suggested, while ligation of the common carotid artery has been practised.

THE REMOVAL OF ADENOID VEGETATIONS WITHOUT A GENERAL ANÆSTHETIC.

Ménière, in a short article (*Ann. d. mal. de l'oreille, etc.*, Paris, 1904, April), expresses the opinion that it is quite unnecessary to remove adenoids under general anæsthesia, and that the dependent position of the head over the end of the table is not required. His reason for taking up this attitude towards the operation is based upon the fact that deaths have occurred under general anæsthesia during these operations, and that it is wrong to expose any child to this risk in order to perform so simple and painless an operation as he considers this to be. He has removed adenoids and tonsils without anæsthesia on more than seven thousand occasions, and on that account he considers that he is entitled to speak with some authority. Pain, in the true sense of the word, is not produced, and what discomfort there is may be reduced to a minimum by the employment of cocaine and menthol. Those who are opposed to his method of procedure have argued, further, that it is extremely difficult to keep many children sufficiently quiet without anæsthesia. Ménière apparently has no difficulty about this, and performs all his operations with one assistant, who knows the special method of holding the child. An argument that is sometimes raised against operating without an anæsthetic is that it cannot be done thoroughly enough. The author considers that this argument is too trivial to discuss. Patients operated upon one day have returned to school on the next without the least complication having ever arisen. Children have been sent home in rain and snow to houses in which the conditions were not comfortable without any serious results. These points appear to be emphasised by Ménière mainly with the object of impressing parents with the simplicity and harmlessness of the operation. We are not prepared to agree with the author regarding the performance of the operation without a general anæsthetic, nor do we think that any of his arguments are of such a kind as would be likely to impress parents with the simplicity of the procedure.

ON THE USE OF FORMAN IN NASAL CATARRH.

FORMAN, when brought into contact with moist air, breaks up into menthol, formaldehyde, and a trace of hydrochloric acid. Fuchs (*Brit. Med. Journ.*, London, 1904, July 9) points out the application of this in the treatment of nasal coryza. In the nose the hydrochloric acid is rendered harmless by the nasal secretions, the menthol and formaldehyde are vaporised, and while the menthol produces anæmia and anæsthesia, the formaldehyde acts as a disinfectant and deodoriser. It may be used as a pastille, as a dressing, or as an ointment. The pastille is used by placing it in a glass which is half filled with hot water, and the steam is inhaled four or five times daily. The ointment is recommended in the treatment of young children. This remedy has been highly spoken of in the treatment of colds. Used at the commencement of the attack, it is said frequently to bring about recovery in twenty-four hours, and if employed when the cold has already developed it will afford considerable relief. Cases of ozæna have also been benefited by the use of forman.

AN EASY METHOD OF ENTERING THE SPHENOIDAL SINUS FOR DIAGNOSTIC PURPOSES.

COAKLEY of New York (*Laryngoscope*, N. Y., 1904, April) invariably investigates the condition of the sphenoidal sinus under the following circumstances. When muco-pus is found in the nose on anterior rhinoscopy; when muco-pus is found in a choana on posterior rhinoscopy; when there is a history of post-nasal catarrh; when the patient complains of occipital pain, or pain referred to the back of the orbits; where polypi are seen on posterior rhinoscopy filling the upper angle of a choana, and in all cases of atrophic rhinitis. It is evident, therefore, that his examination of the sinus is made a routine one. His method of conducting it is as follows: — The nasal chambers are first sprayed with cocaine and adrenalin until the soft tissues have thoroughly contracted. This is followed by a further application of cocaine upon a probe passed between the middle turbinated body and the septum to the posterior limits of the chamber. The nose is then irrigated with sterile normal saline solution, and then by means of cotton-wool mops every trace of secretion is removed. A thin but not too flexible probe, curved slightly upwards at its distal extremity for about ¾ in., is then dressed with a little cotton-wool, somewhat tightly applied. The probe is passed between the middle turbinated bone and the septum, the straight part of the probe being directed ⅛ in. above and parallel to the lower border of that bone. It is carried inwards until it comes in contact with the anterior surface of the sphenoid bone, and by gradually withdrawing it and pushing it forwards again, the whole surface of the bone is explored until the instrument somewhat suddenly passes through an opening into the cavity of the sinus. The sensation thus experienced by the manipulator is very distinctive of an instrument passing through a constriction into a cavity beyond. That the probe has been successfully passed into the sinus, the following points will prove:—If the patient's head be kept in the normal position to the trunk, the instrument will not slip out. On posterior rhinoscopy, the probe will not be seen in the naso-pharynx, but a little of the steel shaft may be visible in the upper part of the choana, but not that portion covered with wool. Vertical and lateral movements of the probe are practically impossible. On the other hand, if the instrument has passed into the naso-pharynx, there is a considerable range of mobility. Diagnosis of sphenoidal sinus disease is made when one or more of the following conditions are present:—When the probe is withdrawn, the cotton-wool rubbed on a slide, and pus is detected with a microscope, the existence of suppuration is confirmed. It must, however, be understood that the nasal chamber has been thoroughly cleansed beforehand. Again, if muco-pus is seen at the upper part of the choana while the probe is in the sinus (there being previously none), the discharge has been forced from the sinus by the instrument entering it. Lastly, the feeling at the end of the instrument is as if the cavity had a velvety, soft, or pulpy lining. In a healthy sinus, a probe dressed with cotton-wool gives the sensation as if it were pressing on bone, due to the thinness of the lining membrane of the cavity.

PUBLIC HEALTH.

UNDER THE CHARGE OF

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The Pollution of Estuarial Waters, and the Contamination of Oysters.

The third volume of the "Report of the Royal Commission on Sewage Disposal" is almost entirely taken up with a report by Dr. A. C.

Houston on an elaborate and extensive series of bacteriological investigations undertaken by him, chiefly in connection with the pollution of tidal rivers by sewage, with special reference to contamination of shellfish. The results of his investigation of samples of water from the Thames estuary do not support the view that there is gross pollution of the Essex and Kent foreshores, produced by the discharge of London sewage at Barking and Crossness outfalls, nor that the deposit of sludge by the London County Council in the Barrow Deep seriously pollutes the Thames estuary. "Taking a broad and common-sense view" of the results of his investigation of the Thames estuary, he is of opinion that the water of a tidal river, grossly polluted in its lower estuarial reaches, may by natural means (sedimentation, dilution, and presumably bactericidal agencies) after a flow of some twenty-five miles "become seemingly as little objectionable, or in some respects less objectionable, bacteriologically, than certain of our public water supplies."

Of twenty samples of filtered London water, taken from the mains of the East London and of the Southwark and Vauxhall Companies, examined, in only one sample was *B. enteritidis sporogenes* contained in a quantity of 10 c.c. Coli-like bacilli were by no means infrequently found in the filtered water, and in not a few instances seemingly typical *B. coli communis.* These results, as Houston points out, though by no means implying that impure waters, even after careful filtration, are necessarily safe for use for domestic purposes, "might be fairly used as an argument against condemning water, owing to the mere presence of *B. coli*, or gas-forming coli-like microbes, irrespective of their relative abundance in the samples," as the water examined was being drunk without any obvious injury to health.

Some interesting experiments were conducted to prove the passage of a particular pathogenic micro-organism through sewage filters. The organism selected was the *B. pyocyaneus* (the organism of blue pus). Experiments were made on the Ducat continuous filter at Hendon, and at the septic tank and contact beds (Cameron system) at Leeds, a watery emulsion from agar growths being used as the inoculating medium in both cases. *B. pyocyaneus* appeared in the effluent from the continuous filter at Hendon within less than ten minutes after the addition of the watery emulsion to the filter, and was recovered from the effluent up to a period of five hours from the start of the experiment, which was discontinued thereafter. In a second similar experiment it was recovered from the effluent up to the tenth day, after which it could not be recovered. In the Leeds experiment it appeared in the liquor from the septic tank two hours after the start of the experiment, and was still present twenty-four hours later. It was also present in the effluent from each of the six contact beds of the installation, in the first emptying after the addition of the emulsion to the septic tank, and on the fourth day was still recoverable from all the effluents. In all cases the absence of *B. pyocyaneus* from the crude sewage was proved by control experiments. While in no way suggesting that these processes are incapable of yielding satisfactory effluents, from the chemical and practical point of view, and in relation to non-drinking water streams, the results broadly indicate "the inadvisability of relying on septic tanks, contact beds, and continuous filters, to remove altogether the element of potential danger to health associated with the discharge of effluents from these processes of sewage treatment into *drinking water* streams."

Thirty-five samples of sea water from the west coast of Scotland, collected by Dr. Gordon, were examined by Houston, and in thirty-four of these neither *B. coli* nor *B. enteritidis sporogenes* were present. In one sample *B. coli* was present. This was the only sample collected from the shore, there being cottage gardens within 50 yards of the point of collection and cottages within 100 yards.

The primary object of the investigation, in relation to the contamination of oysters, was to compare the water and oysters from two rivers in Cornwall—the Helford River and the Penryn River. The Helford River traverses a sparsely populated district, and is considered one of the purest localities for the growth and fattening of oysters. The Penryn River is, on the other hand, polluted, and its oyster layings are by no means above suspicion. Comparing the purity of the oysters from the two layings, it was found that 12 per cent. of the Helford oysters contain one thousand or more coli-like bacilli, while 96 per cent. of the Penryn oysters contained a like number. Only 4 per cent. of the Helford oysters contained one hundred or more spores of *B. enteritidis sporogenes*, while 88 per cent. of those from the Penryn layings contained one hundred or more spores. As regards the water from the two rivers, *B. coli* could be recovered from a bulk of 1 c.c. in 32 per cent. of the Helford samples, and in 84 per cent. of the Penryn samples. None of the Helford samples yielded positive results, when tested for *B. enteritidis sporogenes* in a quantity of 10 c.c., whereas 56 per cent. of the Penryn samples contained that organism in 10 c.c. The Penryn water was bacteriologically more than ten times as impure as the Helford water, and the oysters from the former were about one hundred times more impure than those from the latter. In oysters derived from deep-sea water, remote from any chance of sewage pollution, *B. coli* and its allies "are either absent or, at all events, seldom detectable," and they are also absent from the water over such oysters. These results are most interesting, and Houston is of opinion that they "indicate that the *quantitative* and *qualitative* bacteriological testing of oysters and estuarial waters may prove of great practical value in cases of doubtful pollution."

FERRIC SULPHATE AS A DISINFECTANT.

Dr. H. VINCENT (*Rev. d'hyg.*, Paris, tome xxvi. No. 6), in a paper on the antiseptic properties of ferric sulphate, gives the results of experiments made by him as to the efficacy of this substance as a disinfectant for stools. His experiments have given slightly varying results, depending upon the fluidity of the fæcal matter, and also to some extent on the temperature. As a general rule, the higher the temperature the more perfect is the sterilisation. In one case a proportion of 40 parts per 1000 killed the typhoid bacillus in stools, after thirty-six hours' contact, at a temperature of 18° C. to 29° C. In other cases, and at a lower temperature, sterilisation was not complete with the iron salt in the proportion of 90 per 1000. Cholera bacilli added to chronic diarrhœal stools required a proportion of from 40 to 50 per 1000 to kill them. As commercial ferric sulphate contains free sulphuric acid, Vincent experimented with the salt both in its ordinary state and with the acid previously neutralised with soda, and found that the antiseptic power was only very slightly impaired when the acid was neutralised, as it would frequently be when the sulphate is added to dejecta undergoing fermentation and evolving ammonia in large quantity. Although ferric sulphate is not a substance which can produce absolute disinfection of cesspools, putrefied organic substances, liquid manurial matter, etc., its addition to such matters in proper proportion is sufficient to destroy in one or several days not only putrefactive bacteria but also *B. coli*, *B. typhosus*, and *B. choleræ*. The salt must be present in a proportion of 50 parts per 1000 parts of the matter to be disinfected. For the disinfection of the dejecta from schools, works, barracks, etc., a quantity of 90 grms. (about 3½ oz.) per person, per diem, should be allowed. The substance is cheap, but the cost of disinfection with it is comparatively high when the quantity required is taken into account. Comparing it, as to antiseptic power and deodorising value, Vincent places it after copper sulphate, chloride of lime, lysol, and the alkalies. Its power, he considers, is about equal to that of carbolic acid under similar conditions. *Ferric* sulphate, he says, is incomparably more active than *ferrous* sulphate. This latter, as also chloride of zinc, has only extremely feeble disinfectant value, and he points out, as has been frequently done before, that the use of either of them is to be avoided as giving a false and dangerous sense of security, ferric sulphate being greatly to be preferred to them as a disinfectant.

REPORTS OF THE MEDICAL SOCIETIES.

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EDINBURGH MEDICO-CHIRURGICAL SOCIETY.—*July* 6, 1904.—Professor JOHN CHIENE, C.B., President, in the chair.—Patients were exhibited by Drs. STILES, EDWIN BRAMWELL, ALLAN JAMIESON, CAIRD, DOWDEN, FLEMING, COTTERILL, and SCOT SKIRVING.

Card Specimens were shown by Drs. SYM, MILES, SCOTT CARMICHAEL, WALLACE, GARLAND, STILES, ALLAN JAMIESON, CAIRD, COTTERILL, and CATHCART.—Professor Sir THOMAS R. FRASER read "Notes of a Case of Complete Transposition of the Viscera, with Cerebral Tumour and other Pathological Conditions." In 1888 he had described the case of a female who was the subject of transposition of the viscera, and who suffered from valvular disease of the heart. The present case was a well-nourished man, æt. 24. The primary cause of his admission was a long-standing pyuria, with headache. At the age of 10 he began to suffer from uncomfortable and even painful sensations at the lower and antero-lateral portion of the right thorax. For several years his urine has been muddy, and for seven or eight years he had suffered from headaches. These headaches, however, attracted little attention until about four years previous to his admission, when, after getting a severe wetting, he suffered for several hours from a severe headache with coincident recurrence of pain at the right thorax. A month later, and without apparent cause, a second severe headache occurred, and since then they reappeared at irregular intervals. The pains were always complained of in the sub-occipital region, but the area was not sharply defined. They were attended with flushing of the face and sensation of heat, and with vomiting on a few occasions. With varying intervals of respite, the headaches recurred for about three years, when there was an entire cessation for six months. They then reappeared, at first slightly, but gradually increasing in severity until they attained their original severity. Physical examination soon revealed the fact that there was a transposition of the thoracic and abdominal viscera, and the patient himself was aware of his abnormality. To determine if the transposition involved the lowest portions of the alimentary canal, as well as the higher, two pints of warm water were injected into the rectum, with the result that the sigmoid flexure became dull to percussion in the right flank. The diagnosis was, that the patient suffered from pyelitis as well as from brain pressure, produced probably by a non-malignant tumour situated towards the middle of the brain and beyond the range of surgical treatment. The patient improved in hospital, and remained in fairly good health for several months. The pains in the head returned, however, and were now associated with dimness of vision. This dimness increased in intensity, and was present even without headache. He was again admitted to the Royal Infirmary in January of this year. At this time the suboccipital pain was more severe than formerly, and sensations of formication, numbness, and tingling in the legs were present. Tactile sensibility was somewhat blunted over the left side; the vision was much impaired, so much so, that, with the left eye, ability to distinguish light from darkness alone remained. Lateral nystagmus was present as well as atrophy of both discs (specially of left). Both superficial and deep reflexes, co-ordination, and powers of voluntary motion were normal. The patient was right-handed. Ten days after admission these headaches were observed, and on the fourteenth day an attack commenced and lasted until his death on the following day. The post mortem examination was made by Dr. Stuart MacDonald, and confirmed the diagnosis of complete transposition of the viscera. Photographs and lantern slides were exhibited. The cæcum had the fœtal characteristics of conical shape and small size, and these characteristics were also manifested in the unusual length and upright position of the appendix vermiformis. Pyelitis was also present. In the brain a bilateral hydrocephalus was found, there being much clear fluid in both lateral ventricles. At the level of the lateral ventricle, a translucent rounded tumour, about the size of a large marble, was found, which gave a complete explanation of the symptoms present. The tumour occupied a nearly central position, and was situated between the anterior pillars of the left fornix and the tuberosity of the left optic thalamus, with the greater portion of it to the left of the median line but encroaching slightly to the right. Its position explained the dilatation of the ventricles. Being placed immediately over the left foramen of Monro, it had produced congestion and exerted pressure upon veins proceeding from the corpus striatum and upon a choroidal vein, and its encroachment on the right side impeded the venous circulation of the lateral and third ventricles. The tumour was pear-shaped, the narrow extremity being actually within the left foramen of Monro, and by lateral pressure had obstructed the right foramen. It had apparently grown from the ependyma.—Dr. W. G. **Sym** read a paper on "Metastatic Gonorrhœal Conjunctivitis," which appears in the Journal.—Dr. **Logan Turner** gave a lantern demonstration to illustrate "the Operative Treatment of Chronic Suppuration in the Frontal Sinus." He said that one of the difficulties which surrounded the question of operative interference in this region was the risk of causing considerable disfigurement. While various operations had been devised, there were two principles underlying all the methods employed, namely—(1) Opening and draining the cavity with preservation of the sinus (Ogston-Luc); (2) obliteration of the sinus (Kuhnt). The disadvantages of No. 1 were discussed, and evidence was brought forward to show the frequency of occurrence of suppuration in the sinus thus operated upon, and the fatalities which have occurred in connection with it. It was next pointed out how the disadvantages of No. 1 were overcome by practising No. 2, and evidence was led to show the more favourable results thus obtained. These was then placed against the advantages which accompanied No. 2, the varying degree of disfigurement which might follow obliteration of the sinus. Certain operative procedures might combine the advantages of No. 1 and No. 2 and eliminate as far as possible their disadvantages. Such procedures were osteoplastic resection of the anterior osseous wall of the sinus (the Killian operation).

EDINBURGH
MEDICAL JOURNAL.

EDITORIAL.

Heterogenesis once more.

For half a century the conviction has been growing in the minds of analytical biologists that the living substance of organisms is inconceivably complex in structure, and that it has a specific organisation in each different kind of creature. What the interior of a nerve-cell, or of an ovum, or of a ciliated infusorian, would look like, if we could, so to speak, wander about in its labyrinth, it is impossible to say with any precision, but most working biologists are agreed that even under such magnification the structure would be a puzzling maze. Even the nucleus of the cell is a little world in itself, and whether we people it with "biophors," "determinants," and "ids," or with other hypothetical units—in regard to which we cannot expect any consensus of opinion—we are bound to recognise that the physical basis of life is an extremely complex affair. Moreover, we can directly demonstrate that similar parts and elements taken from different types bear an impress of individuality even in their minutiæ. What makes an animal a distinct type is something that saturates into the arcana of its histological structure: a fish can sometimes be classified by one of its scales or by one of its otoliths; the lens of the dog is different in minute detail from the lens of the cat; the hidden spiculum amoris may be as distinctive of a snail-species as the coloured shell, which displays the specific regimentals externally; and even the cellular structure of related forms often affords evidence of what is awkwardly called "specificity," *i.e.* peculiarity or individuality in the details of organic architecture.

What we have just said is generally recognised, it is as old as Brücke's famous essay of 1861; but we have recalled the familiar conclusions to explain why we have had to rub our eyes over Dr. Bastian's recent re-assertion of "heterogenesis," or the *per saltum* origin of organisms from other quite different forms, *e.g.* of a ciliated Infusorian from a Rotifer's egg, or of a Sun-animalcule from a chlorophyll corpuscle. Error dies hard, they say; anyhow there is little suggestion of the moribund in the stately and vigorous volume before us,[1] in which the author fortifies the position which he made his own some thirty years ago (1871) in regard to *the origin of unlike from unlike*, for that is what it comes to. In about 400 pages and with 815 illustrations from photomicrographs, Dr. Bastian describes case after case in which he thinks he has detected the heterogenetic process at work. Everyone must admit that in defending his position, which it is easy to call "impossible," "quixotic," "futile," and so on, the author has spared neither pains or pence, and has given us at least a fine illustration of loyalty to convictions. In spite of rebuffs, such as the rejection of his papers by the Royal Societies or Academies of London and Paris, Rome and Berlin, he has stood by his guns, and defended his doctrine of heterogenesis, Bastian *contra mundum!* Altogether mistaken he may be, and that, we confess, is our opinion, but we cannot but admire his dogged industry and unflagging enthusiasm on behalf of his "lost cause." We doubt the precision of his methods, we detect the prejudice of a fixed idea—as he in us—but we admire his grit and pluck in sticking to his point, even if that point seem to us to have no dimensions. He has the fearlessness and independence that speaks of greatness, and he never betrays any littleness in his attitude to those who have simply pooh-poohed his extraordinary conclusions.

Most of us are agreed that we have never seen the slightest warrant for believing that a living organism has arisen on our slides or in our cultures except from a pre-existent creature of the same kind. Once upon a time, simple protoplasts *may* have arisen from a medium which had not in it anything distinctively living. This is a matter of inferential opinion, in relation to which we are all almost as good as our neighbours in making any pronouncement. It *may* be, too, that the time of "abiogenesis' is not altogether past. But so far as our experience goes, here we speak with almost all biologists except Bastian, there is no exception to the rule that a living creature arises only from a parent or parents approximately like itself. Moreover, we have our convictions in regard to the "specificity" of detailed organic architecture for each kind of organism. In face of this, Dr. Bastian tells us that the egg of a Rotifer may resolve itself into Infusorians, or into one large Ciliate, and that a chlorophyll corpuscle may by heterogenesis give rise to a Heliozoon. He does not profess to explain how the transformations are effected, he asks us to review his experiments and to repeat them, he suggests that our convictions as to the stability of organisation may be as erroneous as were those of Linnæus as to the fixity of species. Let us, therefore, lay prejudice aside, if we can, and inquire placidly whether Dr. Bastian's experiments may not show that heterogenesis is a hitherto unrecognised or unduly depreciated factor in evolution.

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[1] "Studies in Heterogenesis," by H. Charlton Bastian, M.A., M.D., F.R.S., pp. ix. + 354 + xxxvii., 19 plates, with 815 illustrations. London: Williams & Norgate, 1903. 31s. 6d.

Dr. H. Charlton Bastian, M.A., M.D., F.R.S., believes that he has shown the *de novo* origin of Bacteria within "closed cells," *e.g.* of fruits, or in the caudal bristle of a water-flea. "Scarcely visible motionless specks gradually appear in the structureless protoplasm," and *voila* heterogenesis! But apart from the possibilities—so subtle and illusive—of infection from without, we are well aware that bacteria may be present even where we cannot at the time microscopically detect them, and therefore we are quite unconvinced. From what seems to be a homogeneous pellicle of discrete corpuscles on the surface of organic infusions, Dr. Bastian has observed the emergence of fungus "germs," amœbæ, flagellate monads, and even ciliated Infusorians like Vorticellids. Here we have an interesting and really valuable study of the micro-biology of the surface-pellicle of infusions, but, in spite of the illustrations from photomicrographs, we remain unconvinced of heterogenesis. The amœbæ and infusorians appeared in a milieu from which they had seemed to be absent at the outset; but *were* they absent or were they added to the pellicle in the course of transformation? We have taken a sample of what seemed to be microscopically pure water, and we have seen in this sample after a week or two no small number of vigorous tenants. Did they arise from ultramicroscopic vital particles or from non-living substances, or did we overlook the presence of juvenile forms, or did we insufficiently safeguard the possibilities of infection from without? Our prejudice in regard to the specificity of organic architecture would lead us to conclude that we had made some error, rather than that we had been the privileged witnesses of a case of heterogenesis. We do not press the argument from control-experiments with boiled or otherwise sterilised samples, for it is obviously, and reasonably, open to the champion of heterogenesis to say that such cataclysmal operations as boiling may prevent the inorganic potentialities from asserting themselves! We prefer to say that we are too prejudiced to believe that a distinctive Vorticellid, with whose structural complexities we have some slight acquaintance, *could* arise from anything but its own "flesh and blood," even though Dr. Bastian assures us of the contrary.

That there is a Proteus—a demon of changefulness—within living matter, will be admitted by most evolutionists, or in words to that effect, but to no one has the changeful sprite shown himself off so exuberantly as to Dr. H. Charlton Bastian. "Myriads of chlorophyll corpuscles are converted into myriads of *Actinophrys*"; the parasitic alga *Chlorochytrium* gives rise to Diatoms; and the eggs of the Rotifer *Hydatina* produce ciliated Infusorians.

It must not be imagined that these are mere assertions on Dr. Bastian's part: every case is circumstantially detailed, objections are answered, criticisms are forestalled, photographs are submitted. In so doing, the author has probably made some useful contributions to the life-history of these lowly forms; he has probably got on the track of unsuspected cases of symbiosis, commensalism, and parasitism; he has probably demonstrated some interesting instances of modifiability or plasticity; but he has certainly not proved the occurrence of heterogenesis. It may be difficult, indeed, to explain the phenomena which he records, but no number of photomicrographs will convince us of the sudden transformation of one definite type of organism into another of entirely different architecture,—a magical kind of evolution which is incredible because it is meaningless. If we accept Bastian's heterogenesis, we have to part company not only with the securest results of modern biology, but with our belief in a rational cosmos; and the author's methods are not so convincing that we need hesitate for a moment in choosing between science and mares' nests.

We doubt if any living biologist will ever seriously consider Dr. Bastian's story of a Rotifer's germ-plasm demeaning itself to reincarnation as a large ciliated Infusorian, known as *Otostoma;* but if the author had not drawn his bow quite so far as this case implies, his arrow with "heterogenesis" on its feather might have penetrated further. For biologists are at present much interested in undoubted cases of "transilient," "discontinuous," or "mutational" variations, and are by no means bound down to rigid "homogenesis." The works of Galton, Bateson, De Vries, and others have made us familiar with facts of "saltatory" changes from one position of organic equilibrium to another, and the author need not have dragged in radium or polymorphic crystallisation to support his entirely reasonable view that Nature is sometimes a little brusque. Keeping to biological territory, he could have made a strong case by utilising recent data in regard to discontinuous variations and in regard to what are called heterotopic and heteromorphic phenomena in development. But a recognition of these is not quite the same thing as accepting Bastian's observational conclusion that the chlorophyll corpuscle of Nitella may become a Sun-animalcule, or a Rotifer's ovum a large Infusorian.

We believe that the author has strong evidence in his favour when he suggests incidentally the great plasticity which may occur among simple organisms, and we regard as very useful his idea of "ephemeromorphs," that is, of transitorily occurring phases among unicellulars, which may be wholly due to modificational influence, in contradistinction to the regularly recurrent stable forms which constitute a distinct species. The conception of "ephemeromorphs" is of value in bacteriology, and may be profitably extended to multicellular organisms.

Nor can we declare ourselves adverse to Dr. Bastian's suggestion that some of the lower organisms may still be seething up anew by processes of heterogenesis. Many believe, though without any precise warrant for their belief, that this so-called "spontaneous generation" once occurred, and who is to put in stops in the story of the possible. What we are quite sure about, however, is that a complex ciliated Infusorian does not, will not, can not ever "seethe up."

As a psychological problem, Dr. Bastian's book is very interesting. As an honourable investigator, he tells us what he has seen, but his observations are so intermingled with inferences which we cannot accept, that all the records of years of toil will seem to most of no avail. Was his experience altogether exceptional? Others have repeated part of it (we have tried several times) without observing any of the phenomena he describes. To this he answers,—that the "infection-hypothesis" is overstrained, that he has seen what he saw because he was diligently on the outlook without prejudice, and that, after all, there are the photographs! But the photographs, "engraved and printed," appear to us no more than futile puzzles. And as for his methods, what is the use of criticising them when he says "the methods employed by those who would gain a knowledge of heterogenesis cannot, from the very nature of the subject, be strict laboratory methods." This shuts our mouth, and leaves us not only unconvinced but distrustful.

Radium and Vision. It has been suggested that radium might afford material assistance in cases of blindness. It must be borne in mind that, though radium gives out light-producing rays, it is not self-luminous in the sense of making itself visible. If radium be brought even near to the eyes in ordinary daylight, it gives rise to no special sensation; but if this be done in a dark chamber, with the eyes in a state of "dark adaptation," a strange, weird, ghostly seagreen light is seen, but the substance itself is invisible. If an eye, then, from opacity of cornea or lens is "blind," can those rays help it to see? Not directly, it seems, for two reasons: First, that to give rise to this light at all the radium must be near to the eye, and after a very little time proximity to radium is decidedly dangerous to its integrity; second, that the radium rays pass through all tissues, eyelids, cornea (even when it is "opaque"), bones, etc., so that it is impossible to localise the source. If a candle is held up above one's head, one knows its situation because all but the lower reaches of the retina are protected from its rays, but radium rays passing through everything, this localisation is not possible.

But radium causes many substances to fluoresce, and attention was next turned to the platino-cyanide screen. It may here be remarked that it is not improbably by means of fluorescence that the radium rays are visible at all, for it has been shown (*a*) that the crystalline lens and the retinal tissues themselves are caused to fluoresce, and (*b*) that an eye whose lens has been extracted "sees" radium more readily than one whose lens is *in situ*. Radium has also a direct action on the retinal purple, bleaching it even in the dark, but that has probably nothing to do with the question of vision. By placing a morsel of radium in the neighbourhood of one of those screens, London, having taught his patients to observe the fluorescent light, next endeavoured to get them to appreciate form. On the screen, partially covering it, he placed large letters and figures (a circle, triangle, etc.) cut out of a metal plate; where the metal was, no fluorescence of course was, and with some trouble he got his patients to recognise these letters, and by and by to add one to another and so make syllables, words, and even short sentences. A little reflection will show how this must be a slow process, for the letters had to be large, as the fluorescent rays appear incapable of refraction and could not be focussed upon the retina: unless, therefore, the figures had been of considerable size, they could not have been interpreted by the retina at all. One letter at a time was all that could be employed. Those who had formerly been able to read and write were naturally more easy to teach than those who had not, but even these were taught to write by tracing out in the air with the finger the form or movements of the screen.

But when all is said and done, what these patients perceived was, as is clearly pointed out by Greeff, not radium rays, but light called forth by radium, and none of this can be perceived save by eyes which are capable of perceiving light in ordinary ways. In all probability, therefore, with a bright light and large cardboard or other letters, London could have achieved very similar results. The case stands thus: If the patient is able to perceive light, he can see the fluorescent screen, and probably the silhouetted letters; if he is unable to know light from darkness (*e.g.* from optic atrophy), we have no reason whatever to suppose that the abnormal stimulus of radium could help him, and manifestly the platino-cyanide screen is of no avail.

So far, then, as we have gone at present, radium is not available to assist those who are so unfortunate as to have lost their sight. As to the future, considering the wonderful developments and "miracles" of late years, such as wireless telegraphy, it is best not to prophesy, but merely to say that we have no reason to expect that it will ever be.

The Velvet Cap.

NO subject could more fitly be the text of a graduation address than the development of the ceremonies existing in different universities, and Professor Cunningham is to be congratulated not only on the choice of this interesting theme, but on the manner in which he has accomplished his task. The study of comparative academic functions is undoubtedly well worthy of the attention of all who are interested in the history of the universities. To the superficial observer it may seem a small matter whether the presiding official places a cap of ancient origin upon the head of the graduand, or simply shakes him by the hand. To those, however, who like to ascertain the esoteric meaning of every part of the ceremony, each different act in the academic drama has some historic significance. In his graduation address Dr. Cunningham has most ably traced the origin and growth of different ceremonies in various ancient seats of learning, and has compared these "mystic rites" with "the magic touch of the Velvet Cap," so long the chief feature of Edinburgh graduation. From the gorgeous pageantry of the Middle Ages we are led through the picturesque symbolism of the southern and northern renaissances, down to the more sober ceremonies of the present age. The symbolism conveyed in the magisterial seat, the open book, the closed book, the magisterial cap, the golden ring, and the kiss of peace, are fully unfolded. In much of what Professor Cunningham has thus revealed we are inevitably reminded of "Sartor Resartus"—the significance of academic trappings should certainly take a place in the philosophy of clothes.

Sir Mitchell Banks.

IN the sudden death from angina pectoris of William Mitchell Banks we deplore the loss of a distinguished surgeon and a much-beloved man. While the scene of his life's work was laid in Liverpool, his associations with Edinburgh were always of the most intimate, and provided him with a theme upon which he was ever ready to speak or write with pride and affection. Only a few months ago he presided at the last Kitchen Concert in the Old Royal Infirmary, and more recently still at the annual dinner of the Residents' Club, on both occasions exhibiting that charm of manner and speech for which he was remarkable. No one could recall with so much pathos and humour the old Edinburgh days, or make them serve so valuable an object-lesson to the rising generation of practitioners. As a surgeon, he is most widely known for his pioneer work in developing the operations for the radical cure of hernia and of cancer of the breast. A few years ago, his Alma Mater, by making him an LL.D., conferred upon him the highest honour which it was in her power to bestow, a well-merited tribute to so distinguished an alumnus, and a fitting recognition of his services to science and to medical education.

Sir Frederic Bateman.

SINCE the days when the author of the "Religio Medici" was its most brilliant ornament, Norwich has been the home of many distinguished men, and amongst them there have been a large number of doctors. It may be said in truth that in every generation during modern times the East Anglian metropolis has had some eminent medical men who have reflected credit on their town. Among the names which have shed lustre on Norwich during the last half-century, that of Frederic Bateman stands out prominently. Born in the town, with which his ancestors had been long connected, he was educated for the profession of medicine in Paris, London, and Aberdeen, in the latter of which he graduated. For many years physician to the Norfolk and Norwich Hospital, and later consulting physician to it and to several other Norfolk institutions, he occupied one of the most outstanding positions in East Anglia. His widely known work on Aphasia brought him fame both at home and abroad. From her late Majesty he received the honour of knighthood; he was for long the only English member of the Academy of Medicine of Paris; he was a Honorary Fellow or Member of many Neurological Societies on the Continent and in America. In private life Sir Frederic Bateman was one of the most genial and kindly men in our ranks, and his amiable disposition endeared him to a wide circle. Only a month before his death his family and friends had celebrated his eightieth birthday.

The Oxford Meeting.

THE pleasant memories of the last meeting of the British Medical Association will long linger in the minds of those who were privileged to attend it. From every point of view it was one of the most successful meetings which the Association has ever held. As regards numbers, it was, so far as we know, only surpassed by the last meetings held in London and in Edinburgh. In respect of scientific interest a great amount of excellent work was brought forward. From the social point of view, the gathering was characterised by a series of dignified ceremonies and graceful entertainments. Oxford in itself is an ideal place for such a meeting; its ancient and chequered history, its natural beauties, its picturesque architecture, its literary and scientific associations, all combine to render it singularly adapted for an assemblage of an academic kind. On this occasion Town and Gown vied with each other to make the meeting a success, and the guests who were present had good reason for thankfulness at the completeness of the arrangements made for them.

The President in his address gave an interesting account of the history of the Oxford Medical School, and laid before his hearers some amusing anecdotes of the great men who have adorned the University. Sir William Church, in the address on "Medicine," made a strenuous effort to induce those officially responsible for the Public Health to take effective steps in the direction of real sanitary advance. His words were as courageous as they were wise, and they will probably be of wide effect. The address on "Surgery," by Sir William Macewen, dealt with three important surgical matters—cerebral infection, in regard to which he stated his fully matured views; the existence of a respiratory and cardiac reflex caused by pudic impressions; and the detection of a suitable material for sutures and ligatures. A special feature was the popular lecture on "Disease Germs," by Dr. Ferguson of Cheltenham—one of the most racy and at the same time useful addresses on the subject ever delivered.

A great deal of excellent work was done in the fifteen sections, to which space forbids particular reference. In most of them the attendance was large and the attention unflagging.

One striking feature of the meeting was the Pathological Museum, and we would like to offer our hearty congratulations to Dr. Ritchie on the admirable result of his untiring exertions. Very many—in fact, most—of the medical schools in the country sent interesting and beautiful exhibits, and the result was a collection of specimens of deep interest and great utility.

The entertainments provided for the members of the Association were both numerous and brilliant. The Reception given at Wadham College by the President and members of the Oxford Division; the Conversazione given by the Vice-Chancellor and University in the Museum; and the Reception at New College by Mrs. Collier and the Ladies' Committee, were most charming functions, characterised, as were all the public gatherings, by a blaze of colour. The garden parties, of which there was no lack, were held in the midst of picturesque surroundings; that given by the Duke and Duchess of Marlborough at Blenheim being naturally the greatest centre of attraction. The annual dinner was held in the great hall of Christ Church, and although limited in number (290) was overflowing in good fellowship. Oratory was not absent, and we thought the artist who sketched "Soup" and "Dessert" on the menu card had a thorough appreciation of medical human nature.

Taken as a whole, the Oxford meeting undoubtedly stands out prominently as one of the most successful held in the long history of the Association, whether as regards scientific results or social distinction.

Fourth of July Lockjaw.

THE Americans have found a new disease, or rather an old disease under a new name, which is called "4th July Tetanus." It appears that in Scotland on the King's Birthday the children let off crackers and blank-cartridges from small guns. Unfortunately a large number of people are wounded by the same in America, and if our contemporary is to believed, which doubtless he is, the wounds caused by these explosions upon unoffending passers-by very frequently result in lockjaw. Last year the *Journal of the American Medical Association* investigated the results of the celebration of the 4th of July; they found that there were 466 deaths directly due to the celebration, 406 of which were caused by tetanus. Of the 406 cases which died from tetanus, actually 363 were directly traceable to injury from blank-cartridges. The journal in investigating has only been able to learn positively of seven recoveries in addition to the 406 deaths, so that the mortality seemed to be about 95 per cent. These cases, of course, have been collated from records of various cities throughout the United States, but the number of deaths from tetanus caused by the 4th of July celebrations seem to point out to an excessive existence of the tetanus bacillus in the cities of the United States. In fact, 4th of July lockjaw appears to be becoming a well-known phrase. A long notice follows in the paper before mentioned as to the pathology of tetanus and its treatment, but there is nothing new excepting that the Americans should stop firing off such bacilli in their blank-cartridges, or their giant crackers, on the 4th of July each year. To strengthen this statement, we quote again from the same paper that 4449 people were either killed or injured during that day last year; 2461 were injured, but not fatally, from blank-cartridges and fire-crackers; 1364 were injured from fire-works, powder, cannon, and other causes. The 4th July in America must be a somewhat lively day.

Male Nurses.

WE have received a prospectus of the Male Nurses' (Temperance) Co-operation Ltd., announcing the opening of a Branch of the Institution at 7 Torphichen Street. The Association undertakes to supply male nurses and attendants who, in addition to being fully trained, are also total abstainers. In this undertaking the Association deserves the gratitude and support of the profession, as it promises to supply a long felt want in more than one department of medical practice.

ORIGINAL COMMUNICATIONS.

THE THERAPEUTICS OF THE IRON COMPOUNDS.

By CHARLES D. F. PHILLIPS, M.D., LL.D. (Aberd.), LL.D. (Edin.), F.R.S. and F.R.C.S. (Edin.), *Examiner in Materia Medica in the University of Aberdeen, late Lecturer on Materia Medica at the Westminster Hospital, and Examiner in the Universities of Edinburgh and Glasgow.*

IRON in its various forms is a drug well adapted to the successful treatment of a large number of widely different diseases. Its chief action is undoubtedly exerted on the hæmoglobin and other constituents of the blood. It is not only a medicine but a food. Being required for the normal constitution of red blood, iron is essentially a food; but since illness follows deficiency in the number or quality of corpuscles, and iron in substance will often remedy such illness, it equally comes within our province as a medicine; and, from its curative effects, we may, inverting the general rule, deduce some part of its physiological action. The chief condition in which iron is useful, as Sir Lauder Brunton has shown, is where we have anæmia and chlorosis, "whether these be due to loss of blood, imperfect nutrition, chronic discharges, scrofula, syphilis, malarial poisoning, amenorrhœa, or albuminuria, or be consequent upon acute febrile disease." It is not every form of anæmia in which iron is equally useful, and in pernicious anæmia it is of little value. It is now universally admitted, although at one time the fact was contested, that iron in anæmia and chlorosis increases not only the number of red blood corpuscles, but the hæmoglobin index. Hayem found that in cases of moderate chlorosis the number of corpuscles was not markedly less than normal, but they were altered in shape and size, apparently in consistence, but most markedly in colour, so that a given quantity showed a red tint not deeper than that of half the number of normal corpuscles. Further, after a course of iron, the number of corpuscles in the same patient was not always increased, sometimes it was diminished, but then the corpuscles individually had grown larger and of normal shape, and of so good a colour as to equal even a greater number of the ordinary kind. He concludes, then, that iron acts by improving the internal nutrition of the discs; "it solicits them" to take up more colouring matter. This statement is in the main correct, but from a large number of observations on the blood made in cases of chlorosis, I am satisfied that in this condition there is often not only a distinct decrease in hæmoglobin value, but also a material and substantial diminution in the actual number of red cells, which may fall to nearly 2,000,000 per c.mm., and that without any intercurrent disease. Even if there were no numerical, there is clearly a physical or vital change produced by iron; and although it may be true that ordinary nutriment contains as much iron as should be required, yet it is equally true that in departures from the normal condition of health we have to give it freely and in a readily assimilable form, in order that sufficient may be absorbed. It is not easy to give precise figures as to the percentage of iron present in different articles of food, and in the case of those of vegetable origin it probably depends on whether the soil in which they are grown is or is not distinctly ferruginous. Bunge places at the head of the list spinach and yolk of egg, both of them taking precedence over beef and other forms of flesh food. Some years ago "spinach-iron" was used medicinally, but it appears not to have been a success, although it might reasonably have been anticipated that the laxative action of the spinach would prove beneficial. Yolk of egg is much richer in iron than milk or any of its derivatives. It might be imagined that the amount of iron contained in a mixed dietary would prevent anyone from becoming anæmic; but it is a well-known fact that when once anæmia is developed, no food, or combination of foods, contains sufficient iron to effect a cure, and that little or no improvement ensues until iron is administered. An ordinary diet supplies about $\frac{1}{6}$ gr. of iron per diem, and this suffices to make good, bodily wear and tear in health. Minute traces of the metal are present in all the excretions, but the great mass is found in the fæces, although it was formerly thought, and is still frequently stated, that the bile, and to a lesser extent the urine, were the chief channels of excretion of effete or useless iron.

I have always found in the treatment of simple anæmia that when, under the judicious use of iron, the blood assumes a healthy aspect, and the formidable symptoms disappear, if the iron medication is not persevered with for a considerable period of time, the malady returns in an aggravated degree. Chlorosis is in reality an intermittent disease, the recurrent attacks being spread over a long series of years. No case of chlorosis can be regarded as cured until not only is the blood restored to its physiological normal, but the vascular system has resumed its state of stable equilibrium, the functions concerned in blood formation being performed with regularity and precision. Having regard to the liability to relapse, it is well, as Dr. Clifford Allbutt has pointed out, never to treat a case of chlorosis without telling the patient that the first course will extend over a period of three months, and that for a year after he will have to take iron from time to time, and with little intermission. Dr. John V. Shoemaker very properly urges the necessity for regular and systematic blood examinations in these cases.

The influence of iron in the production of red cells has its limitations, for when the normal number is reached no further increase can reasonably be expected, although I take exception to the statement so often made that 5,000,000 is to be regarded as the standard for men, and 4,500,000 for women. I am certain that these numbers are constantly and materially exceeded, and I have often noted far higher counts in many cases, well over 6,000,000 in delicate and fragile women. The disturbing influence of menstruation is much exaggerated, and I am sure that but a very trifling and evanescent diminution results from this physiological phenomenon. Hunt, however, maintains that in chlorotic anæmia a definite numerical fall occurs shortly before the onset of the menstrual flow, so that it is often possible to predict with certainty the onset of the catamenial hæmorrhage. In anæmia attention should be paid not only to the actual number of red cells, but to their shape and size, for all degrees of deformity are met with. In chlorosis the majority of red cells are young and undeveloped, and never attain their full hæmoglobin value. In these cases iron may have comparatively little effect on the actual number of the cells, but the colour value rises from the outset, and with this there is an improvement in the general condition of the patient. The red cells become coloured by a gradual and successive assumption of equal increments of hæmoglobin, so that the oldest cells are those most highly coloured.

Much difference of opinion exists not only as to the relative advantages as therapeutical agents of the proto- and per-salts, but also as to the comparative merits of organic and inorganic iron preparations. In this association it may be pointed out that many of the so-called organic preparations have no claim to that title, being simply combinations of iron salts with albuminoids, and thus differing but little from the iron acetate or carbonate. The standard now adopted for a definite chemical organic combination of iron is that known as MacCallum's test. There is a tendency, founded on some clinical observations made many years ago, to under-estimate the value of organic iron, but I have always found organic compounds agree better than the inorganic. Iron was at one time considered a panacea for all forms of anæmia, but in reality if prescribed injudiciously it may not only fail to cure, but may produce bad results; and observation of such instances has led some to depreciate a remedy of the very highest value. Direct anæmia dependent upon excessive hæmorrhage; or the indirect anæmia which follows loss of animal fluids generally (such as in obstinate leucorrhœa, empyema, and suppurations, seminal losses, profuse perspiration, diarrhœa, prolonged lactation, or too frequent pregnancies); also the anæmia produced by acute disease such as rheumatism, and that connected with dyspepsia and inanition when the albuminous constituents of blood are really most deficient,—all these forms, though complicated with extreme debility and general hydræmia, may gradually improve with good food, rest, and pure air (especially if the cause be removed); but iron, given in suitable doses so as not to disorder the stomach, will greatly assist and hasten recovery. In other cases, the best dietetic measures alone are insufficient, and iron is indispensable for cure; in the congenital anæmia of children born after profuse uterine hæmorrhage, or whose parents were affected with anæmia, tuberculosis, constitutional syphilis or other exhausting diseases, iron is of special value; also in strumous and rachitic cases, but it requires to be continued for a long time. In the anæmia due to mal-hygiene, to sedentary pursuits, prolonged residence in a town atmosphere, or continued exposure to carbonic acid, iron compounds are also markedly useful. The causes of anæmia are as numerous as the diseases which affect the human body, the blood being so intimately associated with every organ and tissue that it inevitably reflects every change in them. Setting aside cases of "accidental anæmia," those caused by hæmorrhage, toxæmia, or other similar causes, the anæmias naturally fall into two categories, those in which there is a pronounced reduction in the percentage of hæmoglobin in the blood, but not a corresponding diminution in the number of red cells, and those in which the erythrocytes fall well below 2,000,000, and are sometimes but little over 1,000,000. In all these cases, except the last, which are examples of pernicious or essential anæmia, iron is the one and only remedy. I am satisfied that in anæmia, whether the ordinary chlorosis or the secondary anæmia of hæmorrhage, iron is the only drug to which curative properties can be assigned, and that both arsenic and manganese in all forms are valueless in this connection. Dr. Ralph Stockman has shown by a series of masterly researches that arsenic alone is absolutely useless in the treatment of chlorosis, and that manganese is equally valueless in all forms of anæmia. Hannon describes three forms of chlorosis according as there is a deficiency in the blood of iron only, of manganese only, or of both metals. His statements, however, are entirely theoretical; and apart from the fact that even the presence of manganese in the blood is not established, an appeal to chemical observation does not bear out the suggestion of its great importance as a hæmatinic remedy, but rather the contrary. It is true that Petrequin was an enthusiastic advocate for the use of the drug in all forms of impaired blood condition, but the general experience of physicians is not with him or M. Hannon. It may be affirmed without hesitation that the use of manganese in the treatment of anæmia is a thing of the past. Combinations of iron with arsenic or with manganese are an anomaly; each drug has its own particular use and sphere of action, and polypharmacy is usually an admission of a faulty or incomplete diagnosis. Otto Jallase treated a number of chlorotic girls at first by rest in bed and a suitable diet, and later by iron in addition, and found that though the subjective symptoms improved, the percentage of hæmoglobin in the blood remained stationary until iron was added, when it immediately rose, at least 5 per cent. each week. In malarial anæmia, on the other hand, the percentage of hæmoglobin rose steadily after the malaria was cured, whether iron was given or not.

The choice of a compound in any case of anæmia or chlorosis seems to me to depend on the susceptibilities of the patient to the drug, but it is essential that the drug selected does not produce constipation or irritate the mucous membrane of the stomach or intestines. There is little doubt that the value of the "Pilules de Blaud," or Blaud's pill, has been greatly over-estimated, and that, as Coupland states in Allchin's "System of Medicine," quite as efficacious a result is obtained by giving pills containing from 2 to 3 grs. of dried sulphate of iron three times a day. Personally, I prefer somewhat larger doses, and usually prescribe from 5 to 10 grs. three times a day after meals. This of the inorganic preparations is the best, and in chlorosis it will usually increase the number of red cells at the rate of from 90,000 to 100,000 a day, with an improvement of hæmoglobin value of about 1 per cent. or perhaps a little less. The astringent perchloride is less efficacious, and in many cases induces headache with a feeling of plethora or discomfort. The great drawback to all the inorganic preparations of iron is that they intensify the accompanying constipation, a condition nearly always present in these cases. Copræmia is not the cause of anæmia, but it is often an associated symptom, and it is most undesirable to accentuate it by the administration of astringent remedies. It is said that the difficulty may be overcome by the systematic use of certain bitter aperient waters, but it is a bad principle to give one drug which disturbs the functions of the intestinal canal and then another to remove its deleterious effects. The solution of the difficulty is obviously to employ a preparation of iron which, while improving the condition of the blood, will not act as an astringent. Such remedies clearly are to be found only amongst the true organic iron preparations. I have for some time past used with good effect the iron-vitellin discovered by Dr. A. C. Barnes of Philadelphia. It is a definite chemical compound, a red neutral solution, odourless, colourless, and quite free from astringency. As to its efficacy there can be no doubt, for in bad cases of chlorosis accompanied by amenorrhœa and obstinate constipation the red cells increase very rapidly, often at the rate of from 2000 to 3000 for many consecutive days and until the physiological normal is reached. Its influence on the production of hæmoglobin is equally marked, the improvement being at the rate of from 1½ to 2 per cent. a day. It is not only in anæmia that it does good, for it acts as a tonic, increasing the appetite and producing a general sense of well-being.

Iron is so useful in anæmia, that its value in many other conditions is apt to be overlooked. For example, in chronic bronchitis with profuse expectoration, I have found that besides improving the general health it lessens the amount of secretion and modifies its character. In emphysema it is often valuable for its tonic power and its action on the capillaries, as well as for improving the general condition of the blood. Cardiac pain and dyspnœa may often be relieved by iron, by improving the blood in the first instance, hence its advantage is seen most when anæmia is present.

Increased frequency of the pulse is not in itself a contra-indication, but only when increase of tension is also detected. Although iron is contra-indicated in cases of acute and irritative dyspepsia and mal-assimilation, yet certain forms of atonic dyspepsia which are connected with debility and an impaired condition of the blood are well treated by it. There are the general symptoms of anæmia, and also a sense of weight and heaviness after food, and impaired appetite rather than acute pain. In many nervous disorders, and especially in hypochondriasis, it is indicated. The nervous system naturally suffers when it does not receive a due supply of healthy blood, depression and a sense of oppression will be felt, whilst hysterical or hypochondriacal symptoms will be more or less pronounced. In the nervous symptoms which commonly occur in women at the climacteric period, including restlessness, anxiety, fluttering and sinking at the epigastrium, giddiness, clavus, and sometimes menorrhagia, iron acts well. In all these cases iron-vitellin succeeds admirably.

In neuralgia of the stomach occurring in anæmic or chlorotic patients, who complain of cramping pain and distension, accompanied with nausea and vomiting of mucus and an acid fluid before breakfast, and of frequent acid or tasteless eructations after meals, iron is useful, especially in cases dependent on loss of blood from any source or from protracted diarrhœa. Again, in chorea associated with anæmia, iron is indicated and proves most serviceable.

In constitutional syphilis, after mercury in small and frequently repeated doses has done its work and the blood count is subnormal, the judicious exhibition of iron speedily improves the condition of the patient. It must be borne in mind that this malady, like others in which a poisonous material circulates in the blood, much impairs the condition of that fluid, rendering the corpuscles fewer, smaller, and paler.

THE MICROCOSM IN MEDICINE.

By W. H. Coupland, L.R.C.P. (Edin.), *Assistant Medical Officer, The Royal Albert Asylum for Idiots, Lancaster.*

At times it is pleasant to put our feet on the mantelpiece, light our pipes, and think, and to all of us it must sometimes occur that our thoughts turn to ourselves, and our profession. It is one of these fugitive quiet times that called forth the following "cigarette" paper, to borrow an expression from a late well-known journalist.

Let us light a cigar and consider the Microcosm in Medicine. If we appeal to a dictionary, we shall find under the heading Microcosm the word *man*, for such was the title applied to him by Paracelsus long ago, man being considered by him as the epitome of the universe, the centre of gravity, so to speak, round whom all mundane affairs turn; and as the microcosm in medicine we will consider the doctor and his ways, using the term Medicine in the wide sense of our professional work as a whole.

Although there have been classics on the philosophy of travel, books, and gardens, as, for instance, a "Voyage autour mon jardin," and none, yet classical, of a voyage round a medical practice, this reverie will not compete with these, and if much of it is commonplace, it may not come amiss, for did not Oliver Wendell Holmes say that at times one likes to hear others repeat thoughts that we have already passed through our own minds.

If one is not old enough to reach back to the practices of the præ-bacterial days, in spirit we can feel with those old doctors who must have thought with Wordsworth, that a new era was opening for their profession, especially in surgery, and each one must have felt that he was like

> "A pagan suckled in a creed out-worn,
> So might I, standing on the pleasant lea,
> Have glimpses that would make men less forlorn."

What must it not have been to think that hospital gangrene, tetanus, jail fever, and other humours of like viciousness, were to be swept away before the magic wand of Lister. We too may by the advances of medicine be in the same position as those old practitioners, and see our cherished ideas swallowed up in the vortex of forgotten theories. It is one of the features of present-day study that there is less dogmatism than of yore, and theories are useful, not because they are true (for no theories are true), but only when they are fertile; as a matter of pounds, shillings, and pence, the most valuable are those that connect a number of facts in an easily remembered series.

There are scoffers to-day, as there have been as long as there have been any professors of the healing art, but our most bitter adversaries will grant that these lines, put into the mouth of Mephistopheles by Goethe, are far from true:—

> "The trade of Medicine's easiest of all:
> 'Tis but to study all things—everywhere
> Nature and Man—the great world and the small,
> Then leave them at haphazard still to fare."

These lines are worth study. Take line first—"trade of Medicine"; —*trade*—what an unsavoury odour the word has in any connotation with medicine, and yet there is no use disguising the fact that to most of us it is a trade, a means to an end, and that end our livelihood,—a barter of brains and manual dexterity for gold or silver, and—noise it not abroad—for copper. Was it not stated but recently in a court of law, that a visit and medicine together costs 5½d.; and are there not clubs at ½d. a week, the members of which are often in their avidity for drugs only to be compared to the surgery sink? Our high philosophy of the science and art of medicine is apt to abase itself in the presence of the filthy lucre, and the ethics of the books get lost in the present menace of the butcher's bill and the tax-paper, and join the submerged tenth of good intentions. Let us frankly acknowledge that we are but tradesmen, but let us be handicraftsmen of the highest order, giving our best to those who seek our wares, and if we consistently do this we can safely leave the public—our employers —to value our work in its proper way. The time has passed by when from his mere position a medical man was considered more learned than his compeers; the general education in the schools, and the newspapers and books, and the more frequent intermingling of people, has led to a levelling up of brains, and now that prescriptions and ailments are so openly compared, it behoves us to look out for our laurels. With our patients it is very apt to be a case of "if you don't know the things I know, I think *you* don't understand the things you profess to know that I don't know"; what does a woman think of a young medico who is ignorant of the way to make the nourishment he so glibly orders, or what faith will she have in his prescription for the "scalding water" of her infant if he omits to look at the napkins? Well might Hippocrates sum up professional work in his time by saying that "Art is long, opportunity fleeting, experiment uncertain, judgment difficult," and we find it is equally so nowadays.

What does line two say? "To study all things,"—surely that provides us with a comprehensive outlook, and, literally, of course, the advice is impossible. Knowledge is too vast and wide for even a modern Newton to skim but over the surface, and according to Karl Pearson this is not an age for great ability, for the intellectual classes do not reproduce their numbers as they did fifty years ago. He says that you can educate but you cannot create brains when they are absent; if you want a brainy race, you must breed from brains, and it is this very practical problem that the latest 'ology, eugenics, is going to deal with. Musical geniuses are rather beside the point, for music is almost entirely a creative science, and therefore stands on a pedestal by itself. It will be generally conceded that if ever doctors needed brains they want them now, and the vastness of the curriculum appals many a beginner, for he soon gets rid of any first impression that there may be any royal road to the medical register.

At the opening of a session we are sure to read some address which criticises the course of study, and the admission or rejection of biology is the usual bone of contention. It seems to the writer that the issue is plain, for our work is dependent on biological considerations in a far greater degree than heretofore. Take, for example, that awful scourge, sleeping sickness, of which such a lucid account is given by Professor Lankester in the *Quarterly Review* for July, a disease which was but first noticed in Uganda in 1901, and by June of this year is apparently responsible for over 100,000 lives there, and whose ravages have just reached to British East Africa. People say pooh! they are only natives, but they are human lives, and as such are equally important to our profession, and the statement is not quite accurate, for some Europeans have lately succumbed to the disease. The article quoted gives full praise to the Army Medical Service in that they are ready to supply men like Colonel Bruce, able and willing to cope with biological problems; for is not the whole matter a biological one? Is it not to determine the natural history of the trypanosome, and of its host the glossina palpalis. Glossina being a fly of the same group as the common house-fly, and to be distinguished by the slightly divergent wings when the animal is at rest, and by its slightly increased size, points of great practical importance but requiring a knowledge of biology, which science determined the very important difference in the way in which the harmless Culex rests on a wall from the position taken up by the malaria-bearing Anopheles.

Years ago those who practised in England did not need any acquaintance with the complaints of tropical countries, but it is not so now. Rapid transit has meant the dissemination of diseases, and since the Boer war endemic hæmaturia, from Bilharzia, has been found in this country, and but lately ankylostoma has given rise to one of our latest diseases, miner's anæmia. Beri-beri and leprosy have now to be kept in mind by the alert practitioner. Colonisation has upset the balance of the natural geographical distribution of diseases, and has led to serious effects on various races, for which the virulence of measles on the Fiji natives and the decimation of the West Coast natives by influenza will serve for examples. From biology we get much illumination, and Professor Lankester quotes the introduction of the phylloxera into France with the consequent virulent death of the vines, and of nagana occurring in the domesticated cattle in the Transvaal, as instances of the absence of natural immunity, the changes having been so rapid that this protective could not take place. The detrimental effects of town life on our rural population show how time is needed for the occurrence of those processes by which all animal and vegetable life protect themselves against irritants. "Scratch me, and I'll scratch you," or, as the French say, "Passez-moi la rhubarbe, et je vous passerai le séné," is seen all around, and it was the influence of the environment that Darwin laid so much stress on. Natural immunity is a field that is yet hardly worked, and the daily round of practice is sure to afford many examples of what is now obscure; one has only to mention the presence of cancer areas and houses, evidence for the supposed infectivity of acute infantile poliomyelitis, the reasons for the distribution of rare diseases, such as cretinism and chondrodystrophia fœtalis, less accurately called achondroplasia. Much work is to be done on antenatal pathology, of which the last two diseases are examples, and general practice affords the opportunity, for as the old Newcastle apothecary said of the doctor that

". . . . If he hurled
A few score mortals from the world,
He made amends by bringing others into 't."

Achondroplasia was but recently put into the books, and yet it is a very ancient disease, for the deformities of the arms and legs are admirably seen on the statuettes of the Egyptian god Ptah, and even the great peculiarity of the disease, the divergence of the third and fourth fingers, may be made out. It is possible at first sight to confuse a cretin baby with an achondroplasic infant, or with a very young example of Mongolian imbecility, but it is of great importance to make a correct diagnosis, for by thyroid you can *almost* put right the cretin, whereas the mother of the achondroplasic you can only impress firmly with the cold comfort that no drugs will cause the limbs to grow, but her darling will be mentally sound, perhaps musical; to the parent of the peculiar type of imbecile you can pose as a marvel by rattling off its characteristics of liability to physical disability in the way of bronchitis and diarrhœa, of its imitativeness and general old-fashionedness, and the likelihood that it will sit cross-legged like a tailor. If you confuse any of these conditions with rickets you lose time, and probably leave the kudos that you ought to have had to some other more astute practitioner. Those who see much of the unsound mind in the unsound body (for you find the two intertwined) will know that many problems await solution, and that heredity is at the bottom of most of them. Why do we get a history of a fright to the mother about the fifth month of pregnancy in the case of a Mongol, or the information that they are the offspring of parents who have had a large family? and why is it that adenoma sebaceum (Pringle's disease) is a peculiar affection of the face the sufferers from which are mentally defective?

It is the general practitioner who has the chance of explaining the inter-relation of environment with tissues; for bad tissues, like bad material in cheap watches, will show itself in time, and in medical work we see many instances of premature wearing out of tissue, such as the nervous diseases of adolescence which so often are found in several members of a family. Why should Jewish children have the special privilege of that peculiar fatal complaint usually ending in the second year with symptoms of weakness, apathy, mental failure, and that characteristic cherry-red spot in the macular region, with loss of sight from degeneration of the retinal cells? and why do we have hereditary ataxia, or the cerebellar variety, or those very interesting but little known family periodic paralyses which may attack either the general or the ocular muscles, and are these due to vascular alteration, as is the intermittent limping of horses, a similar complaint being not unknown in man?

Medical men ought to record their observations however humble, for an insignificent observation may blossom forth in later years into paragraphs in the text-books, as happened to Gruby's note that there was a flagellate organism in the frog's blood, which remained unverified from 1843 till 1871, and was the forerunner of our knowledge of the group of trypanosomes. So, too, did Burford's note on enema rashes remain unnoticed from 1888 till 1894, when Suckling and Coupland described other cases, and then after experiments the subject became incorporated with the text-books. In recording observations, do not follow the way of a celebrated French astronomer who made most important notes upon the flaps of used envelopes, and whose valuable records were barely saved from destruction. One observation will lead to another, for, as Omar Khayyám said,

> "The moving finger writes; and, having writ,
> Moves on."

We cannot all hope to be *au fait* with modern laboratory methods, and to many of us chemical tests and the apparatus of the present-day pathological room are like a mass of Chinese letters, yet we can all cultivate the scientific spirit, and avoid those things that Bacon remarks on in his "Advancement of Learning":—"Another error is an impatience of doubt and haste to assertion without due and mature suspension of judgment . . . if a man will begin with certainties, he shall end in doubts, but if he will be content to begin with doubts he shall end in certainties." We may not be able to write brilliant essays in science, although we have read (as all ought to do) the lucid book of Professor Allbutt, but we can aim at the standard set by Roger Ascham in 1570 in his work "The Scholemaster," wherein he says, "All soch authors, as be fullest of good matter and right judgment in doctrine, be likewise always most proper in wordes, most apte in sentence, most plain and pure in uttering the same." Poor old man, he little knew the depths of modern science, and the publication of Spencer's definition of evolution must have made him turn in his grave. Listen to these thirty-six words as finally revised in 1867, for there were only nineteen in the edition of 1862: "Evolution is an integration of matter and concomitant dissipation of motion, during which the matter passes from an indefinite, incoherent homogeneity, to a definite, coherent heterogeneity, and during which the retained motion undergoes a parallel transformation." To the average man it is about as intelligible, although far less humorous than the student's definition of philosophy, which he stated was "like a blind man looking in a dark room for a black hat which isn't there."

Let us take broad views of things, and avoid viewing "a small portion and thinking that all," as Blake said, calling that demonstration and being thus blind to all the rules of life. Virchow, alas! no longer with us, was able instinctively to see the *beyond* in things, and he said that the "progress of medicine should be as the progress of humanity, and the measure of its practical and theoretical utility should serve at the same time as a measure of the correctness of what it accomplishes." These are very inspiring words, for the whole trend of modern medicine is to the prevention of disease, as Penn quaintly wrote, "It is well to cure, but better to prevent a distemper. The first shows more skill, but the latter more wisdom." And again, it must be repeated that to the general body of practitioners, moving and working amongst the masses, is left the task of ensuring the future hygiene of England, of leading the people to that goal of ideal education which consists, according to the late Sir John Simon, in knowing cleanliness from dirt, and thereby the instinctive avoidance of disease. Much is now talked as to our physical deterioration, and in a recent book Mrs. Watt Smyth draws a sad picture, her opinion being that "it is impossible not to be convinced that upon the question of feeding during infancy and early childhood turns the whole question. If up to the age of three or four years every child were judiciously fed they would grow up robust." And she says further that "no amount of after-care will ever make up for the first years of neglect." You will never educate brains and nerves that are crying out for nourishing blood, and with all our physiological hanky-panky we have not yet found a substitute for maternal milk for the infant, although we perversely fill a unilocular stomach with fluid meant for a multiloculated one, and then wonder that cow's milk disagrees with the poor hand-fed bairn!

Seeing that so much of general practice is associated with the young and their ailments, it does seem that too little stress is laid on the anatomical peculiarities of the child, and the young doctor thereby gets unnecessarily puzzled; points like the more funnel-shape of the appendix vermiformis, and the larger relative size of the bigger air tubes, with the lessened tension in the arteries and concomitant difference in the rhythm of the heart sounds in infancy will make clear the apparent abnormal character of the diseases of these regions. Special attention is now being paid to the lymphatic system and to the recent researches on the "Status Lymphaticus," and its probable presence if looked for in some of those cases of sudden deaths in infants, when unenlightened juries, in the absence of medical evidence and a post-mortem, bring in an unmeaning verdict of "over-layed." Hypertrophy of the circumvallate papillæ of the tongue may put another complexion on an obscure infantile death, but it will be some time before thymism is a common term in the nomenclature of diseases. There is much to learn from the infant who lies "muling and puking" in its mother's arms.

In the future as in the past, the doctor, however well up he may be in the latest laboratory methods, must not forget that he has to treat the patient as well as the disease; as Moxon used to remark to his students, "It is quite as important to know what kind of a patient the disease has got, as to know what sort of disease the patient has got." It is not sufficient to purge, but the wary practitioner will keep this motto in mind, "Bene curat, qui recte purgat." Medical officers of asylums and those in idiot institutions are perhaps too prone to lay stress on the influence of the mental factor, but the general profession pay too little heed to the personality of the patient and its possibilities as an agent in therapeutics. It will be a sorry day for medical art when Tinctura Spei is a drug no longer carried with the emergency bag, be the practitioner ever so scientific. Thus did Ralph Waldo Trine describe the coming physician: He says he will teach us cheerfulness, goodwill, and noble deeds, for a health tonic as well as a heart tonic; for "a merry heart doeth good like a medicine." That to yield to remedies was half the cure was an aphorism even in Seneca's time, and faith and the personality of the doctor are of untold value in the service of humanity. We can safely leave our reputations in the hands of others. "My fame is in the hands of others. I have weighed in a nice and scrupulous balance whether it is better to serve men or to be praised by them, and I prefer the former." So said that master of medicine, Thomas Sydenham. There are many working practitioners, unknown to fame, whose work is appreciated and who are beloved, and shall it be said adored, by their patients, from whom they secure the homage and thanks like the Glen gave to old MacLure, of whom they said that the "verra look o' him wes victory" (Ian Maclaren).[1]

Those who possess a good classical training are much to be envied, for they can enjoy the old heroes of our profession, who were, if nothing else, very astute observers, their powers of diagnosis, as far as the knowledge of their times allowed, being excellent; perhaps their acuity was greater than that of the present day, when the knowledge that a man with a test tube many miles away will diagnose your enteric or your diphtheria for you, or even your Bright's disease, renders men careless. The lack of Latin grammar once led a chemist into the following quandary:—An old practitioner prescribed *ext. rad. valer.*, and directly below it, in the same mixture, he wrote "tinct. ejusdem"; the chemist being unversed in the intricacies of *eidem*, *eadem*, *idem*, and unable to find tinct. ejusdem in the shop or in his books, called on a friend, and in his best off-hand way said, "We are out of tinct. ejusdem, can you let me have a little? All the reply he got was the advice to go and ask at Apothecaries' Hall for it!

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[1] There are many examples in our profession illustrating that

". . . . Lives
Grow sweet and strong by faithful following
Of dull, hard lines that never rise above
The commonplace."

Many medical men find a difficulty, when searching for further information on an interesting case, as they have not cultivated that second kind of knowledge that the American spoke of—that that you know where to find. Their practice makes them rely too much on the other division—the knowledge you carry with your fists! "A knowledge of reference *is* knowledge," said old Malmesbury. The old-fashioned way of learning the classics by hunting the translation in a dictionary was a most useful training, accelerated, if progress was slow, by sensory stimuli to that part of our anatomy posteriorly that Spigelius considered the seat of divine cogitation. Modern nerve pathology has shown that motor nerve cells in the cord or brain only act normally as long as they are kept in touch with continual incoming sensory stimuli; do not adults of all nations resort to devices for stimulating the brain when they want to think extra hard, chew a pen, or scratch the top of their heads, or knock the side of their nose, or even, as G. R. Sims confessed, suck a baby "comforter." After all there may have been some method in the madness of the Flagellants.

In our work we do well to keep in mind the five "wittes" described by Hawes in 1515 in the Passe-tyme of Plesure, these being firstly Common Witte, which explains itself, then Ymagination, which stimulates the common sense, thirdly Fantasy, which causes the mind to act, Estimation guiding the way of action, and Memory as a fifth witte keeping note of all previous events. We have great need in our work of ready wit, of common sense, and what sometimes carries one even farther—a sense of humour; if these are combined with a plentiful supply of good health, we shall take with us on our visits that cheerful face which, said Benjamin Franklin, is nearly as good for an invalid as healthy weather.

The cigar has burnt out and it is time to seek acquaintance with the one *universal* practitioner, as Sir William Gull used to say, that is—a warm bed. We have agreed that we are tradesmen, but take advice from Poor Richard, "drive your business, but don't let your business drive you," for that way lies disaster. As the Arabic legend has it, it was not the angel of the plague who killed 50,000; he was but responsible for five thousand; it was fear and worry that killed the rest. Let us each have a hobby quite outside our work, even if only the collection of picture-postcards!

"Because a man has sheep to mind
In time and place, since flesh must live,
Need spirit lack all life behind—
All stray thoughts, fancies fugitive,
All loves except what trade can give?"

This reverie is but a poesie of other men's flowers, 'tis but the thread that is mine own. The medical profession is, and ever will be, a power in the land, even if we include specimens like the old Dublin physician Brenan, a verse of whose poetry I close with:

"Here ends my song on Doctors, O,
Here ends my song on Doctors, O,
Who, when all damn'd
In hell are cramm'd,
Will beggar all the Proctors, O."

CHRONIC INTESTINAL DYSPEPSIA OF CHILDREN.

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In one's work in the out-patient department of a children's hospital, one is struck by the very large number of children between the ages of 4 and 10 who are brought to the doctor with a group of symptoms which does not fall under the heading of any of the diseases commonly described in medical text-books. On studying these cases, one finds that in a fully-developed example there is a well-marked and fairly constant symptom-complex which, in lack of a better name, I propose to call the Chronic Intestinal Dyspepsia of Children.

Before proceeding further, it may be well to describe a typical case:—

A boy, æt. 8, is brought to the hospital; his mother states that he is wasting, "has no life in him," "is very nervous," "has a headache in the morning," "suffers from pains in the chest," "has a bad cough, and seems to be in consumption." When interrogated as to the duration of the illness, she states that he has always been weakly, but has been worse the last few months. On examination, we find that the child is very thin but is not emaciated, that he has a sallow complexion, dark rings round the eyes, and anæmic conjunctivæ. The chest is found to be perfectly healthy, though badly developed, on account of the presence of adenoids and enlarged tonsils. The "pains in the chest" are found really to proceed from the epigastric region. The tongue is slightly furred, and several carious teeth are present. On questioning the mother, we learn that the child is very restless at night, suffers from night terrors, and awakes tired, languid, and with frontal headache. He frequently has attacks of cramp-like pain in the epigastric region, is nervous, and cries very easily. His appetite is very poor and distinctly capricious. Some slime and a number of thread-worms have been noticed in his motions. In other words, and even more briefly, the typical case is that of a child about the period of the second dentition with the symptoms of wasting, languor, nervousness, frontal headache, epigastric pain, deranged appetite, cough, and nocturnal restlessness, accompanied by some of the other signs or symptoms already mentioned.

From this description it is seen that it is from symptoms much more than from signs that the clinical picture of the disease is drawn. It may, with some justice, be argued that there is no definite proof that the condition is really one of chronic intestinal dyspepsia, or, at any rate, that chronic intestinal dyspepsia is the primary factor of the disease. To some extent this objection is, unfortunately, true. At the same time it is of the utmost importance that we have some name for the disorder—a name which will enable us to have a clear mental picture of the group of symptoms, but which will not be capable of too wide an application, as would be "the marasmus of childhood"—and will not bind us to any preconceived idea as to the etiology of the condition—as do the names "lithæmia," "neurasthenia," and "mucous disease."

The importance of the recognition of this condition as a definite clinical entity is very great, and this for three reasons.

In the first place, it is an exceedingly common condition. Carr (1), in an article on "Chronic Dyspepsia in Children," in which he discusses this condition, says that "in the ordinary routine of hospital out-patient work among children of say, from 2 to 10 years of age, a very large proportion, if not the majority, of the cases, are brought for digestive disturbances or their consequences." I would go further, and say that, of the children between 3 and 12 years of age seen in the out-patient departments in London, two-thirds of them are suffering from "digestive disturbances or their consequences." Almost half of these present the typical symptoms of the condition which is now under consideration.

The second reason is that, by correctly diagnosing the disease, one can at once reassure the relatives as to the prognosis of the child's condition. The symptoms often closely resemble those of tuberculosis,—general tuberculosis, phthisis, or *tabes mesenterica*,—and the mother's fears are too frequently increased by her medical man, who may tell her either that the child is "going into a decline," or, actually, that the child has consumption.

The third, and even more urgent reason for the importance of the recognition of the condition, lies in the fact that by correctly diagnosing the disease one radically alters the treatment, and, instead of stuffing the child with food and drenching him with cod-liver oil and syrup of the hypophosphites,—which both tend to aggravate his condition,—one can, by suitable dietetic and medicinal means, comparatively quickly arrest a condition which otherwise would probably continue to a greater or lesser extent for years, and, by lowering the general vitality of the patient, would render him more liable to intercurrent disease and its consequences.

In most of the standard books on medicine, little or nothing is said about the condition. Even in books devoted to the diseases of children the information is most meagre. There is, however, one notable exception, Eustace Smith (2), in "The Wasting Diseases of Children," gives a full and very accurate description of the malady under the heading of "Mucous Disease." Another excellent account of the disease is given by Carr (1) under the title of "Chronic Dyspepsia in Children." Quite recently, too, Hutchison (3) gives a short, but at the same time comprehensive, account of the disorder. It is probably the most accurate description of the condition yet given. In most of the text-books, however, the symptoms which make up the clinical picture of the malady are each described as a separate disease, and their relationship to one another is ignored, and, consequently, the view is narrowed, and the treatment recommended is mainly symptomatic. It is, to say the least of it, surprising to find that such an extremely common malady is so little recognised, and, as far as I am aware, no attempt has hitherto been made to collect a series of typical cases and to tabulate and analyse the symptoms, although it is obvious that this is the only way by which we can verify our opinions and increase our certain knowledge of the condition. I have accordingly made full notes of fifty typical cases seen at the Out-Patient Department at Great Ormond Street Children's Hospital,[1] and have followed their after-history for periods varying from a few months to over three years.

The fifty children of whom particulars were collected were selected as being fairly typical examples of the disease when at its worst. In considering the following statistics, we must remember that it is only with pronounced cases of the complaint that we deal, and that innumerable children have its symptoms to a lesser extent, but that, from one cause or another, it does not assume the severe form of the full-blown case which we shall consider.

I have intentionally selected only the severest cases, because one must first have studied the typical case, before one can recognise and properly treat the milder forms of the disease.

The following are the main facts elicited in the study of the fifty cases I have investigated:—

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[1] One case was seen at the West London Hospital, and one at the Margaret Street Hospital for Consumption.

ETIOLOGY AND DURATION OF THE DISEASE.—*Parents' wages.*—In his most interesting and instructive book, "Poverty," Rowntree (4) defines "primary poverty" as that occurring in "families whose total earnings are insufficient to obtain the minimum necessaries for the maintenance of merely physical efficiency." In York, he found that primary poverty occurred, unless a family of five persons, paying a weekly rent of 4s., earned at least 21s. 8d. per week. Calculating from these figures, I found that the parents of 16 of my series of 50 children were in primary poverty. It must be stated, however, that in my figures the wages earned per week did not include moneys earned by members of the family other than the chief bread-winner. The patients' mothers, too, in order to be certain of being allowed a hospital letter, probably frequently understated their husbands' weekly wages, and that this occurred was borne out from the fact that several mothers placed their weekly income at a higher figure to me than they did to the clerk from whose books my statistics are taken. On the other hand, these figures do not take into account "secondary poverty"—that is, poverty occurring in "families whose total earnings would be sufficient for the maintenance of merely physical efficiency, were it not that some portion of it is absorbed by other expenditure, either useful or wasteful." There can be no doubt, therefore, that the parents of a considerable number of the children in my series of cases were in such a condition that they had not "sufficient for the maintenance of merely physical efficiency." It is questionable, however, if the percentage was greater than it is in the general population. Rowntree found in York that 27·28 per cent. of the total population were living in primary or secondary poverty, and Booth (5) estimated the percentage in London at 30·7. He also considers that "other cities, if similarly tested, would show a percentage of poverty not differing greatly from that existing in London."

That such poverty has a detrimental effect on the physical condition of the children who suffer from it, stands to reason, and if proof of it were wanted, it is admirably supplied by Rowntree in Chapter V. of his book, in which, by actual weights, measurements, and statistics, he shows how much poorer are the development and prospect of life of children suffering from "poverty" than of children with sufficient and proper nourishment. On the other hand, that chronic intestinal dyspepsia of children is by no means limited to the poor, can be at once affirmed by any practitioner attending the poor or middle classes, who can recognise the symptoms of the disease. Parents whose means will allow of it are apt to indulge their children in many ways that may predispose them to the disease, and this the poverty of the poorer classes forbids.

In my cases[1] the wages earned were as follows:—

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[1] Particulars were not obtained in all fifty cases.

Class A.	(four to six of a family)[1]	less than 18s.	per week,	1
„ B.	„ „	18s. to 21s.	„ „	11
„ C.	„ „	21s. „ 30s.	„ „	27
„ D.	„ „	over 30s.	„ „	4

The condition as to room accommodation in my series of cases was as follows:—

In 2 cases there was less than 1 person to each room.
„ 4 „ „ „ 1 „ „
„ 12 „ „ were more „ 1 „ and less than 2 to each room.
In 9 cases there were 2 persons to each room.
„ 7 „ „ more than 2 „ and less than 3 to each room.
„ 4 „ „ 3 persons to each room.
„ 3 „ „ more than 3[2] persons to each room.

There was no apparent relationship between over-crowding and the presence of adenoids and enlarged tonsils, night terrors, or morning headaches.

In regard to locality, as was only to be expected, the great majority of the cases came from London and its suburbs. Four, however, were country children; and one of these came from Haslemere, in Surrey—a locality accounted to be the healthiest in the south-east of England.

In order to find if chronic intestinal dyspepsia were more frequent in town than in country children, as well as to contrast the two classes generally, I have begun an examination of a large number of cases from both areas, but the investigation is not sufficiently advanced to allow of its incorporation in the present work. It would seem, however, that the disease is fairly common in children living in the heart of the country, and probably it will be found that the question of town or country life has little influence in its causation. At the same time, there can be little doubt that the stimulating objective life of the town exaggerates the nervous phenomena of the disease; and that this combined influence tends to produce the person "stunted, narrow-chested, easily wearied; yet voluble, excitable, with little ballast, stamina, or endurance" (^{6}), who is so typical of the lower-class town life of to-day.

Race.—In my series of cases several nationalities were represented. Their relative frequency probably fairly accurately represents the percentage of their ordinary incidence in all cases coming for advice to Great Ormond Street Hospital.

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[1] If the entire family numbered less than four, a certain sum was added to the weekly income for each person less than that number, and the converse was done if the family exceeded six.

[2] In one of these instances, two of the cases—brother and sister—were members of a family of seven living in two rooms. In the other instance, a family of four lived in one room.

Town and country life of ancestors.—According to Cantlie (7), a third generation of pure Londoners of the lowest classes is almost unknown. Other observers have made a similar statement. Of the twenty-six cases whose parentage I investigated, nineteen were pure English to the third generation, and of these nineteen cases, two were certainly, and three—or possibly four—others were probably Londoners to the third generation. Considering the enormous influx of the country population into London in the last fifty years, and the amount of intermarriage that must take place between the newcomers and the Londoners by birth, the number of children in the above figures, all of whose parents and grandparents were Londoners, does not appear small. It might be argued that there is a great predisposition to chronic intestinal dyspepsia of children in the effete London stock, and certainly, if Cantlie's conclusions are correct, the number of Londoners to the third generation in my cases is very high; without further investigation, however, no definite conclusion can be arrived at.

Family history.—It is unfortunate that, with the time at one's disposal, it was impossible to inquire into each family history with that degree of detail without which information would be of little use. What one would have liked especially to ascertain was whether there was a neurotic taint in the history of the children's forebears. From the few facts obtained, it seems likely that this is so, but not enough information was got to allow of any definite conclusion. A tuberculous history was given in some cases, but probably not in more than one would get in the ordinary community. There were no facts elicited which would show that the disease occurs especially in families with a gouty history.

That the disease affects special families is certain. Three families had two representatives each included in my fifty cases, and in at least three of the other cases another member of the same family had been treated by me for the same disease, though it was present in a less pronounced degree.

This family incidence is almost certainly due to at least two, or possibly all three, of the causes—hereditary predisposition, diet, and improper hygienic surroundings. I have been unable to get cases suitable to supply the answer to the question as to which of these factors is the chief cause of the family incidence of the disease. The answer, however, should not be difficult to arrive at, and, when got, would solve to a great extent the etiology of the malady—it would tell us whether the main factor in causing the disease was hereditary and irremediable, or was due to causes which increased dietetic and hygienic knowledge might remove.

Diathesis.—Amongst the children all types were seen. Several had the pleasing features, the fine complexion, and the long silky hair and eyelashes of the fine tuberculous type; others again had the large teeth and the colouring of the typically rheumatic child. The diathesis was generally masked, to some extent, by the signs of the disease.

School.—It is noticeable that the period of life at which the disease occurs corresponds fairly closely with the period when the child attends school. Some forms of headaches and night-terrors are no doubt exaggerated by school-work, and the misguided efforts of so-called education of the ordinary Board school, by which for many hours every day the child's brain is crammed with undigested facts, whilst his physical education is neglected or ignored, prevent, for many months in the year, a sufficiency of physical exercise from being obtained.

Inattention of the bowels, and consequent constipation, might be an etiological factor. Constipation was not very frequently present in my cases, and even when observed, was more probably a symptom than a cause.

A typical diet is the following:—

7.30 A.M.—Tea, bread and jam, occasionally dripping.
11 A.M.—Bread and butter.
1 P.M.—A little butcher meat, potatoes, bread, currant or suet pudding; water; occasionally milk or tea.
5 P.M.—Tea, bread and jam.
7 P.M.—Bread and butter or jam.

Taking the results as a whole, it may be said that in probably every case the staple of life is white bread; the usual drink is tea, which is generally given at least twice a day. The amount of carbohydrates in the diet far exceeds that of nitrogenous substances and of fats. The four principle carbohydrate foods are—(1) Bread, (2) sugar, (3) potatoes, (4) milk puddings, such as sago and tapioca. A few centuries ago the poorer classes had neither sago, tapioca, sugar, nor potatoes, and their bread was coarse and brown, and so contained much less assimilable starch than does the fine white bread of the present day. Even fifty years ago most of the carbohydrate foods were much dearer, and, consequently, less excessively partaken of.

We thus see that this great preponderance of sugar and starch in the diet is only of comparatively recent date, and it appears highly probable from these grounds that this may be a strong factor in the digestive disturbance. This supposition receives strong confirmation from the beneficial results, in the treatment of these cases, of limiting the ingestion of carbohydrates. Another fact, which strikes one on considering the diet of these children, is the absence of indigestible residue; to this, probably to a great extent, is due the constipation that is occasionally met with.

Bad teeth.—As we shall see, the great majority of the cases have carious teeth, and the septic matter discharged from these may probably, when swallowed, be a cause predisposing to the disease. The rapidity with which, in some cases, the food was eaten, may be a factor in the causation, as well as a symptom of the disease.

Second dentition.—That the disease occurs just at the period of second dentition is suggestive, and this may be of considerable etiological importance.

Sex.—Of the fifty children, thirty-four were boys, and sixteen girls. Though this, perhaps, is a rather larger proportion of boys than really occurs in the disease, there is no doubt that it is commoner in the male sex.

Age.—The age incidence was as follows:—

Age (last birthday).—	3,	4,	5,	6,	7,	8,	9,	10,	11,	12.
Cases.—	3,	4,	6,	7,	7,	10,	4,	3,	4,	2.

From these figures we see that three-fifths of the cases were between the ages of 5 and 8. At Great Ormond Street no children are allowed to attend who are more than 12 years old. From the way in which the cases diminish before the age of 12, however, as well as from experience of the out-patient departments of general hospitals, one may conclude that comparatively few cases occur after that age. As the figures show, it is rare to find cases before the age of 4.

DURATION OF THE DISEASE AND PREVIOUS ILLNESSES.—It was practically impossible to get any very definite information as to the duration of the disease, as its onset is so insidious, and the parents usually stated that it had lasted "for years," or that the child had "never been very strong," and in the majority of cases no definite onset had been noticed. In four cases the disease was said to have begun after measles, and in two it was first noticed after whooping-cough. The small number of cases in which the mothers ascribed the origin to whooping-cough is of interest in view of Eustace Smith's statement (2) that "whooping-cough is, however, of all the diseases the one to which this derangement can most commonly be traced." A considerable number of mothers, however, said that their children had been worse since some exanthema—generally measles, though whooping-cough came next in order of frequency.

Because of the close analogy between chronic intestinal dyspepsia and rickets, it would have been interesting to have found how many of the fifty cases of the former had suffered from the latter disease. Owing, however, to the indefinite demarcation from the normal of the milder forms of rickets, statistics would be of little use. Few of the children showed obvious signs of former rickets. Three of the mothers volunteered the statement that their children had suffered from "consumptive bowels"—*i.e.* diarrhœa and vomiting—in infancy. Four cases were said to have had pneumonia, and one rheumatic fever. In six cases the previous health was said to have been good. In each case the severity of the disease fluctuates greatly from time to time, and after a change of air, or an acute attack of vomiting and diarrhœa, the child may appear comparatively well. One finds that there is a distinct seasonal variation in the severity of the symptoms; the patients are generally worse in the early part of the year—January to May.

Before leaving the subject of the etiology of the disease, it will be well to state the conclusions arrived at by other observers. Eustace Smith (2) considers the disease is very frequently the result of whooping-cough, and also of measles. Hutchison (3) lays great stress on the excessive ingestion of carbohydrates. Carr considers the three most important etiological factors to be hereditary digestive weakness, town and indoor life, and improper feeding. Dessau (8) considers the offspring of gouty parents especially liable to the disease. He thinks (9) that over-feeding, as a rule, is the great source and origin of chronic intestinal indigestion in children. This theory can hardly be supported, for it is often in children who eat very little that one sees the best examples of the disease. Goodhart (10) considers the condition "the expression of a constitutional build"—that the patients are the offspring of parents whose nervous systems are feeble or diseased. Donkin (11) also "agrees with Dr. Goodhart in recognising in them a strong neurotic relationship."

Several of the observers consider that the nervous element is the predominant factor in the disease. Although the good results of dietetic treatment are not in favour of this view, there is much in the etiology and symptomatology to support it. In my opinion it plays a very important rôle in the causation of the malady, and is second in importance only to dietetic errors, more especially to excessive carbohydrate ingestion.

Following close on these in order of importance is, I consider, the excess of brain work and diminished fresh air and physical exercise entailed by the school life of the present day. Measles or whooping-cough frequently exacerbate the condition, but probably are of little etiological importance unless combined with some of the above factors. Other causes which I think exaggerate the condition are overcrowding, town life, bad teeth, and the second dentition.

SYMPTOMS.—*Languor.*—In every case there was a complaint of languor, though, naturally, its amount varied. Frequently the mothers noticed this as one of the most prominent symptoms, and brought their children, "because they had no life in them;" they "lay about," and could not be got out of bed in the morning. Generally this excessive lassitude is most marked in the morning, and gets less as the day advances. Combined with this is another very constant, and, at first sight, contradictory symptom:—

Excitability.—As many of the others expressed it, their children were "shocking nervous." They cry at the least thing, are afraid—often even in the daytime—to be alone, and jump at the slightest noise. They blush or grow pale at the slightest emotional disturbance. One of the most marked changes as the result of treatment, from the point of view of the child's mother, is the allaying of this excessive excitability. Children, who cried at the slightest word of reproach, will lose this nervousness and become no more easily affected than would a healthy individual. Of the series of fifty children, only one was said not to be nervous or excitable. Another practically constant symptom, and one to which, perhaps, some of the morning languor is due, is—

Nocturnal restlessness.—All except two had more or less disturbed sleep. (The mother of one of these two did not sleep in the same room, and was not very intelligent.) In thirty-eight of the cases, the child would wake up screaming, or had real night-terrors—sitting up in bed, crying with fear, and, although apparently wide awake, for some minutes being quite unconscious of its surroundings or of its mother who tries to pacify it. In thirty-one of the cases it was noted that the child ground his teeth, and the great majority of them talked in their sleep and snored. Five only were sleep-walkers. Six of the children suffered from night sweats. One had day-terrors, similar to night-terrors, but occurring in the day. One boy, who had very severe night-terrors, defæcated involuntarily during them. As a rule, it is in the early part of the night that the child is very restless; towards morning he generally falls into a deep, lethargic slumber, from which, occasionally, it is difficult to wake him. As we shall find later, a considerable number of the cases had large tonsils or adenoid growths. Contrary to what one might expect, these did not seem to have a very great effect in causing night-terrors.[1]

Constipation, on the other hand, seemed to have a definite influence on their production in some cases. In eighteen of the children the bowels were regular, and in eighteen there was more or less constipation; of the former, five were without night-terrors; of the latter, only one. Many of the mothers volunteered the statement that their children were much more restless at night when they were attending school, and that when they were kept quiet at home their rest was much less disturbed. This was much more frequently ascribed as a cause than was an access of their digestive troubles, thus supporting the view of Henoch ([12]), Steiner ([13]), and Wertheimber ([14]), rather than that of West ([15]) and Silbermann ([16]), namely, that it is to nervous, rather than to digestive influences, that the condition must be ascribed. On the other hand, it does not follow that the digestive disturbance from which these children suffer is not the primary factor—acting by rendering their nervous equilibrium more unstable. That this is very probably the case, is seen from the facts that constipation has a distinct influence in causing the condition, and that merely by dietetic means, by diminishing the amount of the carbohydrates, the sleep of those children can frequently be rendered much more placid and refreshing.

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[1] "Night-terror" is used here in the widest sense of the term, and includes cases not only of true pavor nocturnus, but also those cases in which the child wakes up screaming or crying from fear, but quite realising his surroundings.

Atkinson (17) considers that night-terrors are associated with enuresis, which he says is the result of the fright. It was not often that the two symptoms occurred simultaneously, though the number of children who had enuresis and also had night-terrors was slightly larger than calculation would warrant.

Though not one of the most prominent symptoms, enuresis falls naturally here for consideration. Thirty children did not wet the bed, two had formerly done so, six wetted it rarely or occasionally, and six did so frequently. In relation to their numbers, the proportion of boys and girls was practically equal—ten boys and four girls. Several children found it difficult to hold their water for any length of time during the day. The sex incidence would tend to show that phimosis had not much influence in causing these cases of enuresis.

Enuresis has been frequently ascribed to the presence of worms, and to enlarged tonsils or adenoids. The present statistics show that only the proportion of children one would mathematically expect who suffered from enuresis also had intestinal worms. On the other hand, eleven of the fourteen children who had enuresis had also enlarged tonsils or adenoids. This figure seems to be beyond the chance of incidental error, for the number should be only 7·5.

The next and very important symptom to be considered is—

Headache.—Forty-seven of the fifty cases suffered more or less from headache. Two of the three children between 3 and 4 years old did not complain of it, the other child who was without this symptom was aged 6. In several other cases not included in these statistics, it has been noticed that it is comparatively common for the youngest children suffering from the disease to make no complaint of this symptom. In forty-four of the forty-seven cases in which headache was complained of, it was felt in the frontal region. In one of the remaining cases it was confined to the left frontal region, in another to the temporal areas, and in the third to the right vertex. In thirteen of the cases it occurred at no special time, in eighteen it generally came on in the morning, in nine it occurred most frequently after school, and in one it occurred either in the morning or after school. Three children had it most frequently in the evening, and in the remaining three cases it occurred only when the child had "bilious attacks"—exacerbations of the disease which shall be described later. It is unfortunate that time did not permit of the examination of the eyes in every case. A certain proportion of the cases were tested,—unluckily the exact numbers have not been kept,—and of these six had errors of refraction, two had hypermetropia, one astigmatism, two hypermetropia and astigmatism, and one had myopia. In three of these six cases the headache came on after school, in another it appeared in the evening. The two other children in whom the headache came on in the evening were two of the three cases in whom the headache was not frontal in character—one had headache in the temporal region and the other in the left frontal region. The child who had right vertical headache had a discharge from the right ear. Eight of the nine cases in whom the headaches came on, especially after school, were between the ages of 6 and 8—just the age when children begin to have steady hard work in their classes. Neither night-terrors, enlarged tonsils and adenoids, nor constipation appear to be the cause of the headache which occurs when the child awakes.

Cough.—Forty-eight of the children had a cough, though it was generally slight, and frequently was described as merely a "hacking," and was little more than the clearing of the throat. Sometimes, however, it was said to be "barking"—the typical "stomach cough." At the time of examination, in only one case was there any bronchitis, though in a considerable number, on auscultation, one heard an occasional rhonchus, especially on deep inspiration.

From the fact that practically all the children had cough, it would appear that enlarged tonsils or adenoids had little to do with its causation. Even when there were no large tonsils or adenoids, the pharynx was generally more or less congested, however, and it was to this cause probably that the cough in the great majority of the cases was due.

Epigastric pain.—Forty-seven of the children suffered from attacks of pain in the epigastrium or right or left hypochondrium. It generally came on at no special time, in only four cases did it appear after food. Occasionally the child would wake crying with it during the night, and in some instances it was most frequent in the morning. In several cases it was said to be "just under the heart," and the mothers occasionally feared that it originated in that organ. It was frequently so severe that it caused the child to come home from school.

From the fact that the pain had generally no relation to food, and that it was frequently felt in the right or left hypochondrium, it seems likely that it originates, as Henoch ([12]) says, not in the stomach but in the large intestine. There was no apparent relationship between this symptom and the presence or absence of mucus in the stools, and it occurred as frequently in cases where the bowels were regular or where there was diarrhœa, as where there was constipation. This observation is quite contrary to the statement made in most of the text-books on children's diseases,—namely, that colic is generally the result of fæcal accumulation.

On inquiry it was found that many of the cases were very prone to have a "stitch in the side." This pain is of a different nature to the epigastric pain just described, and occurs only after exertion.

Pains in other parts of the body.—Two children complained of pains in the legs, and one of pain in the left knee. One child had slight lumbago, and one was suffering from a mild attack of "stiff neck." In no case were rheumatic nodules observed. One boy complained of numbness of the hands.

Wasting.—In every instance, without exception, the mother said her child was growing thinner. In those cases in which the illness had lasted "off and on" for years, during the remissions the child would gain a little weight, only quickly to lose it again when it had a relapse. This symptom will be further discussed when we proceed to consider the physical examination.

Appetite.—In the great majority of cases the appetite was deranged; in only four cases was it said to be ordinary. In twenty-four it was always poor, in nine always ravenous. The other cases alternated between these two extremes. There was a distinct relationship between the sex of the child and the character of the appetite. In all the female children, with the exception of two, the appetite was persistently poor. No connection seemed to exist between the amount eaten and the frequency of defæcation, or the presence or absence of worms. An excess of mucus, as we shall see later, was noticed in the stools of some of the patients. When this excess was present, the appetite was generally poor. As it is known that sugar increases the amount of mucus secreted, and as it appears probable that one of the factors in the causation of chronic intestinal dyspepsia is an excessive ingestion of carbohydrates, the mothers of the patients were interrogated as to the amount of sugar and sweets their children ate. About half of the cases were stated to take a large quantity, but no relationship can be traced between the taking of an excess of sweets and any of the signs or symptoms of the disease under consideration. It must not be forgotten that even those children who take no sweets may, nevertheless, eat an excessive amount of carbohydrates, as by far the greater proportion of carbohydrates ingested is taken in the form of starch. The rapidity with which the children ate their food seemed to depend almost entirely on the character of their appetite. Whilst those with ravenous hunger would bolt their food, the others who had poor appetites did not seem to eat too quickly.

Irregularity of the bowels, though, unlike the above symptoms, not a constant feature of the disease, is nevertheless very frequently observed. In only eighteen of the cases was it said that the evacuations were neither constipated nor diarrhœic. Twelve cases were constipated, six were inclined to be constipated, seven alternated between constipation and diarrhœa, and four between diarrhœa and regularity. Two children suffered from lienteric diarrhœa, and one generally had several loose motions after going to school. Patients in the class from which these statistics are compiled are apt to think that a slight degree of constipation is the normal condition of health, and it was necessary to guard against this source of error by asking definitely how often the bowels moved, and inquiring into the nature of the motions, otherwise several cases which were really constipated would have been classed as regular. Contrary to the description given by Holt (18), and by Rotch (19), the motions were generally said to appear quite normal. In only one case were they stated to be of a greyish colour, in two it was said that they were very dark, and several mothers remarked that they were very offensive. The above figures show us that constipation is frequent, but is by no means the *fons et origo mali* that it is accused of being by so many observers. Those cases of alternating constipation and diarrhœa are typical of the patients in whom there are recurrent attacks of—

Gastric fever, which it may be well here to consider. A typical case of the severest form was that of William K., æt. 9, who every three weeks had attacks of headache, vomiting, and diarrhœa. During the attacks he was acutely ill, the tongue was dry and furred, the temperature was high, and he was delirious. He had a severe pain in the epigastrium, and wetted the bed when asleep. He had almost complete anorexia. This acute illness lasted for three or four days, and then all the symptoms subsided, and for a few days he was much better than prior to the attack. The diarrhœa stopped and constipation took its place, his appetite then became ravenous, and his mother stated that "it is almost impossible to satisfy him." After a week or so the symptoms of chronic intestinal dyspepsia gradually became more marked again, and slowly increased in severity till they culminated in another acute attack. Six of the children in the series of fifty had attacks similar to this, though the seizures were not generally so frequent as in the case cited, and in some the symptoms were less severe and the duration was longer. It was rare that the mother could assign any definite cause for the onset of the attack. In at least nine other cases there were "bilious attacks" which resembled the above in character, but were not so severe, and some of the mildest consisted only in attacks of vomiting and severe headache. Even in the cases of gastric fever there was no definite jaundice, though there was generally a slight icteric tinge.

It is seen that the symptoms of these acute attacks are very similar to those of appendicitis, and, without very careful physical examination, may lead one to a wrong diagnosis. When the vomiting is not a prominent symptom in the attacks, one may at first think of enteric fever, but the previous history of the child, especially the history of former attacks of a similar nature, ought to prevent the physician from being misled. They also closely resemble, and in some cases may really be, severe attacks of megrim.

Jaundice.—There was a history of an attack of catarrhal jaundice in six of the cases.

Vomiting was noted as a symptom only in the above fifteen cases, and in three others in which it occurred in the morning, shortly after getting up. Five other children occasionally complained of nausea, and in two the food "repeated."

Flatulence is only rarely complained of.

An excess of mucus in the motions.—The symptom on which Eustace Smith (2) lays so much stress was observed in not quite half the cases. In thirty of the children it was said either that slime was not present or that it had not been observed. In five it was only rarely seen, in three it was noticed when there were attacks of diarrhœa, and in twelve it was frequently observed. It is probable that in some of the cases an excess of mucus might be present in the stools without the mother's being aware of the fact, but in these instances the children were generally old enough to be interrogated on the point themselves; and, on the other hand, some of the cases in which a certain amount of slime had occasionally been noticed, might not really be producing a pathological amount of that lubricant, so that, on the whole, the figures given are probably fairly accurate. The character of the mucus varied in the different cases, and was described as "thick white," "thick yellowy," "greeny yellow," or "brown," or as "like phlegm," or "pieces of slime." This excess of mucus, as one would expect, was present much more frequently when there was constipation or diarrhœa than when the bowels were regular. In one instance, in which there was much mucus in the stools, it was also observed in excess in the vomited matter.

Intestinal parasites.—Intestinal worms are very frequently found in cases of chronic intestinal dyspepsia, and the figures of the fifty cases under consideration are probably lower than the average. The figures are—in three cases tape-worms had been seen, in two the *Ascaris lumbricoides*, and in six cases thread-worms were present at the time of examination. In nine other children thread-worms had formerly been present, but had been got rid of; they were still present in only one child above seven years of age. Before intestinal worms can flourish there must probably always be a predisposing, as well as the exciting cause, and the condition of the bowel in chronic intestinal dyspepsia admirably suits the growth of the parasites. Their presence in the intestine, therefore, is to be considered much more as a symptom than as a disease, and many of the symptoms ascribed to worms are really due to the disease which allows of their existence. Contrary to what one might expect, there appeared to be no close relationship between the presence of an excess of mucus and of worms.

Attacks of pallor.—The presence of this symptom was inquired into only in twenty-two of the cases. Seventeen of the children were said by their mothers frequently to "come over white." In the remaining five this had not been observed. A description, typical of many of the others, was given by the mother of Eva B., æt. 4½, who said that her daughter "changes" about six times a day, all her face becomes yellow, except round the eyes, where the colour is almost black. She feels faint, and cannot stand whilst the attack is on; it lasts about ten minutes. Some of the children actually faint in these attacks, but this is quite the exception. Exertion, epigastric pain, and emotion were said sometimes to produce these attacks, but most frequently they came on without any apparent cause. It is unfortunate that the presence, or absence, of this symptom was not inquired into in every case; as far as the statistics go, they seem to show that there is a relationship between the condition and the presence of worms. In nine of the seventeen cases who "came over white," there was a history of intestinal parasites (including the three cases of tape-worms and one of the two cases of round-worms), and of the five who did not have attacks of pallor, only one had (thread) worms.

Cold hands and feet.—In most of the cases, the mothers stated that the extremities were generally cold. The occurrence of cold hands and feet generally means a diminished blood supply to these parts, and consequently more or less congestion of the internal organs. That this symptom may tend to prolong the disease is, as Eustace Smith says, very probable.

Stammering, aphasia, and asthma after meals have all been described as occurring in chronic intestinal dyspepsia of children, but were not found in any of the fifty cases under consideration. The question of masturbation was not inquired into; in no case was it mentioned as having been observed by the parents.

PHYSICAL EXAMINATION.—*Facies.*—The typical facial appearance, as my notes show, is a pale and sallow complexion, dark rings round the eyes, and an appearance of great tiredness. If the child is excited, however, his face will readily flush, and for a few minutes he will, to superficial observation, appear bright and well. The nutrition of the face appears very rarely to suffer so much as that of the trunk and extremities, and, as a consequence, in none of the cases was the face noted as being very thin; the faces of nine of the children, on the other hand, were described as fairly fat and well nourished. Twelve of the children were said to have an "adenoid" appearance; two were put down as typically tuberculous looking.

Nutrition.—The nutrition in three cases was described as "fair," in three as moderate, thirty-seven children were said to be thin, and seven very thin. In no case, however, was there actual emaciation; and, on the other hand, probably in no case did the nutrition reach the normal standard. The muscles felt soft and flabby to the grasp. The younger children were, as a rule, better nourished than were those a few years older. Sixteen of the children were weighed; the following table gives the particulars:—

Initials.	Sex.	Age.		Weight.		Difference in Weight from Average Child of same Sex and Age.[1]
		Years.	Months.	Stones.	Lbs.	Lbs.
E. J. .	Girl .	4	0	2	6	+ 4
F. D. .	Boy .	4	6	1	12¾	− 7
P. C. .	Boy .	4	9	2	5½	− ½
C. H. .	Boy .	5	7	2	5½	− 2
H. D. .	Girl .	5	9	2	4¼	− 3
L. H. .	Girl .	6	4	2	8	− 1
A. L. .	Boy .	6	3	2	10½	− ¾
R. C. .	Girl .	6	3	2	¾	− 7½
S. A. .	Boy .	7	6	2	11½	− 5
W. W. .	Boy .	8	6	2	9¾	− 12
W. K. .	Boy .	9	0	3	4¼	− 5
E. P. .	Girl .	10	6	3	11	− 2
T. H. .	Boy .	11	1	3	12¼	− 6¾
A. G. .	Boy .	11	7	3	10	- 13
W. W. .	Boy .	12	0	3	9¾	− 15
H. S. .	Boy .	12	6	4	8½	- 2½

Skin.—In a great number of the cases there was a certain amount of harshness of the skin, though it never reached the degree so typically seen in advanced tuberculous disease. Three of the patients had eczema. The complexion was generally sallow.

Conjunctivæ.—There was generally a slight degree of anæmia: in only four cases was the anæmia pronounced. At the time of examination, the conjunctivæ of none of the children showed a definite icterus.

Teeth.—In only eight cases were there no carious teeth; each child, on an average, had three teeth with cavities.

Tongue.—The condition of the tongue was found to be very variable, and presented no constant features. There were two types, however, which were fairly frequent. In the first, the back of the tongue was rather thickly coated with a whitish yellow fur, whilst the rest of the organ was fairly clean, but was covered with a layer of saliva, which Eustace Smith (²) aptly likens to a coating of gum. This "gummy" appearance of the tongue is due to an excess of mucus in the saliva, and consequently, before it can be seen, the dorsum of the tongue must be quite wet. It will not be observed, therefore, if the child has just swallowed, or been doing much talking immediately prior to inspection. One may see a case in which the condition is typically present, but on looking at the tongue again after a lapse of a couple of minutes the gummy appearance has quite disappeared. Whilst this condition was fairly frequently observed, it was only very rarely as typically seen as it is in any severe case of pertussis.

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[1] The average weights are taken from Treves' "Physical Education" (20), p. 6, Table I. The average weights in the table are given for each year of age, and the age of the child is put down as its age at last birthday; I have added on half a year, therefore, as representing the average, and have based my calculations for the special month required for this assumption. My cases were weighed nude; I have calculated the clothes as one-eighth the body-weight.

The second type of tongue was that in which the mucous membrane of the entire dorsum had a whitish, sodden appearance, as if it had been steeped in some alkali, and in which the fungiform papillæ stood prominently out from this white background as raised, bright, pink prominences.

My notes show that in the majority of cases these two types were distinct, though in many cases they merged into one another, and some of the characteristics of one type were combined with those of the other. As might be expected, the "gummy" tongue was more frequently observed in those cases in which mucus occurred in the stools.

Palate.—The majority of cases had palates which were higher and narrower than normal; this was especially noticed in those cases who had adenoid growths in the naso-pharynx. In one case only was the palate deformed.

Throat.—More or less chronic pharyngitis was almost constantly present, and there was enlargement of tonsils or adenoid growths in twenty-nine of the cases. Of these twenty-nine cases five had pigeon-breast, and two others had also deformed chests. Most of the text-books give a long list of "reflex symptoms" of adenoids and enlarged tonsils. As we have already seen, several of the other signs and symptoms of chronic intestinal dyspepsia of children are produced or exaggerated by their presence; but from the fact of so many children having the disease without their presence, we may at once conclude that they are not the origin of the trouble. If further proof were needed, one might mention two children in my series of fifty cases, in whom the tonsils and adenoids had been removed and had not recurred, one 1, and one 3 years previous to examination, but in whom the usual signs and symptoms of chronic intestinal dyspepsia were typically present.

Heart.—As formerly stated, no children with distinct *morbus cordis* were included in the series of cases. In four of the cases there was some systolic impurity at the apex of the heart, but in none of them did there appear to be any organic valvular lesion. The pulse of another of the children was very irregular; in this case, too, there was no organic cardiac disease.

Abdomen.—In only six cases was there "pot-belly"; in five out of these six cases there was either diarrhœa or alternating diarrhœa and constipation. The prominence of the abdomen in all these cases was due to excessive flatus. In many of the children, the stomach was carefully examined, and it was found only in one instance to be distinctly dilated, in one of the above cases in which there was a pot-belly and a history of diarrhœa. In only one child was there any area of the abdomen in which there was marked tenderness or pressure. It occurred, in this case, in the right hypochondrium, and there was no apparent cause for the symptom (the child recovered without any special treatment for this symptom). Scybalous masses in the descending colon were searched for in a few of the cases in which the bowels were said to be regular, but were never definitely palpated. Comby (21) describes symptoms resembling those of chronic intestinal dyspepsia in children in whom he has discovered floating kidney. About a dozen of my cases were accordingly examined for this condition, but in none was it found to be present.

Urine.—The urine was examined for albumin in thirty-five of the cases, and in five of these the result was positive. In all these five cases in which albumin was present, the mothers were asked to bring a specimen of the water passed immediately on getting up in the morning. This was examined, and was found to show, in every case, not the slightest trace of albumin. In none of the five children was there a history of scarlet fever. All five cases, then, were examples of cyclic albuminuria.

One of the children in whose urine albumin was present was a girl of 6 years. This age is a year younger than the age mentioned by Sutherland (22) in his table of collected cases. The remaining four children were all 10 years or older. In my series of fifty cases of chronic intestinal dyspepsia, thirteen children were 9 years old or more. The urine was examined in eight of these thirteen cases, and albumin was present, as we have seen, in four of the eight cases. As far as one could see, beyond the occurrence of albumin in the water, there was no feature in the history or clinical examination of those children with cyclic albuminuria by which one could distinguish them from the other cases, and it seems a mistake, therefore, to class as a separate disease cases identically similar to those of chronic intestinal dyspepsia, possessing only the additional symptom of cyclic albuminuria.

It may be objected that cyclic albuminuria occurs at a later age than does the disease under consideration, but we have already seen that many of the other symptoms are more prominent at special ages—thus headache is not so frequent in children under 5 years of age, and headache occurring in the afternoon occurs generally between the ages of 6 and 8. Though we cannot yet explain why cyclic albuminuria should be seen only in the older children, it would be absurd, on that ground, to set it apart as a separate disease. An excess of nucleo-albumin was frequently present, but, unfortunately, it was not always tested for, and the fact of its presence was not always noted. Its presence in excess is mentioned in six cases, and in three the reaction for its detection was negative. In all cases in which the urine was examined, the specimen was obtained in hospital, except in those with cyclic albuminuria, when the morning urine was also tested. Uric acid was not observed with the naked eye in any specimen. Frequently on standing the urine deposited a dense cloud of urates. A certain number of cases were examined for glycosuria, but in every instance the result was negative.

Spine.—In two cases there was an appreciable degree of lateral curvature, but in both it was slight in amount.

Temperature.—Except during the attacks of "gastric fever," the disease probably always runs an afebrile course. There was nothing to suggest the presence of pyrexia in any of the cases in my series at the time of examination, and, in the few instances in which the temperature was taken, it was found to be normal.[1]

PATHOLOGY.—The opportunity of examining the internal organs of a patient suffering from this disease is rarely obtained, and, as far as I am aware, no case has been described.

Eustace Smith ([2]) considers that the condition is due to an increased secretion of mucus from the whole internal surface of the alimentary canal, "a mucous flux which interferes mechanically with digestion and absorption of the food." It is true that in a considerable number of cases one can get a history from the mother of "slime" having been frequently noticed in the motions, but in the majority of instances this excess has not been observed, and in some of these cases the mothers are confident that had it been present they would have seen it; moreover, even were mucus constantly present in excess, it by no means proves that this is the cause—and not the result—of the condition. He considers that the most common cause of the excess of mucus is an antecedent attack of whooping-cough. Hutchison, on the other hand, says it is due to the excessive ingestion of carbohydrates, and especially of sugar.

It is probable that some defect not only of absorption but also of metabolism exists; in some cases the appetite is voracious, and in many of these the bowels are constipated. It seems incredible that sufficient nourishment is not absorbed, but notwithstanding this, the child continued to waste. In this relation the dense precipitate of urates so often observed is suggestive. It would be of great interest to accurately measure the nourishment taken, the amount and nature of the excreta, and the daily weight. Such an investigation, however, would be difficult and very open to fallacies, for when taken into hospital, these children at once improve and their symptoms diminish or disappear.

It may be well to consider shortly the theories of those who recognise the symptom-complex of the disease, but ascribe it to causes other than intestinal dyspepsia.

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[1] The children were always seen in the morning.

Twelve years ago, Sutherland (23) described a series of symptoms closely resembling those we now discuss. He attributed them to the uric acid diathesis, and, since his paper, several observers, especially in America and France, have taken a similar view. Thus Rachford (24) cites many cases, some of them showing symptoms due, obviously, to the passage of uric acid, others again having a clinical picture closely resembling that of intestinal dyspepsia.

Comby (25), in an address delivered before the Section for Diseases of Infancy of the International Medical Congress of 1900, also described several conditions, which he said were due to the lithæmic diathesis. The symptoms he describes do not, however, so closely resemble those of intestinal dyspepsia as do those described by Sutherland. Following symptoms of a nature similar to those described by Sutherland (23), there may actually be the passage of gravel, as is described by Levison (26). There is no doubt, however, that many of the symptoms of a great number of these lithæmic children are due to intestinal dyspepsia, and that the conditions overlap. Curiously enough, one of the very best descriptions of intestinal dyspepsia is given by Sutherland when describing the symptomatology of cyclic albuminuria (22).

Dr. Sutherland considers that, in cases of cyclic albuminuria, "there is a general pathological condition present, to which the various symptoms may be ascribed," and that this is "a condition of toxæmia similar to, or identical with, that of the uric acid diathesis." As we have seen, cyclic albuminuria occurred in several of the children in my series of cases.

According to M. Rousseau-Saint-Philippe (27), the entire pathology of childhood is dominated by "the infection of the intestinal tract, and the auto-intoxication which proceeds from it." In infancy it is the stomach and small intestine which fail; in later childhood it is, above all, the large intestine. He considers that improper food, hurried meals, bad teeth, and neglect of the bowels, are largely to blame for causing the condition. The accumulated fæces, in very constipated cases, consist, he says, partly of imperfectly digested material, but also, very frequently, of intestinal sand.

DIAGNOSIS.—Little need be said under this heading, as most of the questions of differential diagnosis have already been considered when dealing with the symptomatology of the disease. As we have seen, the malady is frequently mistaken for tuberculosis. It seems a prevalent belief that pulmonary tuberculosis is quite common in children of this age, and one cannot help thinking that the origin of this idea is to be found in the diagnosis of consumption when the disease is really chronic intestinal dyspepsia. Though it did not occur in any of my fifty cases, it not infrequently happens, especially when there are adenoids or large tonsils, that one gets on auscultation a number of moist crepitations limited to one base. Removal of the enlarged glands and general treatment soon cause these pulmonary signs to disappear. It is well to remember, as Hutchison (3) says, "that pulmonary tuberculosis is a disease almost unknown in children of this period of life." Before one knows the disease as a definite entity, one is frequently at a loss how to diagnose, and in what way to treat the numerous cases that appear, and one is haunted by a suspicion that there is "something behind" the symptoms; one's mind dwells darkly on general tuberculosis, tabes mesenterica, appendicitis, or Bright's disease, and one leaves the case with the feeling that one has failed to discover the root of the trouble. Once the existence of chronic intestinal dyspepsia of children is realised, however, the horizon clears, and, to one's own comfort, one quickly places the symptoms in their proper position, and is enabled at once to give the treatment which is found to cure or relieve the condition. A word of warning must be given, however, not to neglect to examine every case fully, for the malady frequently accompanies, and may considerably mask, concomitant disease, and though, as we have already stated, phthisis is rare at this age, still, of course, it does occur. One point of difference is the irregular progress of chronic intestinal dyspepsia—exacerbations followed by remissions. In doubtful cases the evening temperature taken for some consecutive days ought to clear up the diagnosis, and, except in the earlier stages, the child suffering from tuberculous disease is more emaciated and the skin is drier than in the milder malady. Bacteriological examination of the sputum, and the result of treatment, ought to clear up any doubt which may still remain as to the nature of the disease. If one recognises, in milder cases, the presence of the disorder, one will be able to treat the case much more effectively, just as, in a case of head sweating in an infant, one must remember the possibility of rickets, even although, at first sight, there are no other obvious signs of it.

PROGNOSIS.—The disease is, of itself, probably never fatal. On the other hand, it lessens the strength and diminishes the resistance against other maladies, and thus frequently produces a fatal issue where otherwise recovery would have resulted. As to the prognosis of the continuance of the malady itself, very much depends on a proper carrying out of the treatment. The fifty cases whose symptoms we have studied were all treated as outpatients, and accordingly one could not be certain that, even whilst under treatment, they carried out the instructions as to diet; most of them, when sufficiently recovered, returned to exactly the same food they had had prior to being brought to hospital. At the same time, the results of treatment were very satisfactory. Every one of the children in my series of cases after a certain time ceased to attend hospital, either because they were perfectly well, or because their symptoms had become so slight that further medical supervision was no longer considered to be necessary. During the last few months I have asked the parents again to bring their children to hospital, in order that I might see how their health had been since they had been discharged. The average duration from the first visit to the last was 1 year and 8 months.

The result of my inquiry was as follows:—Seven children were said to be quite well. In twenty-four cases it was said that the health was "much improved" or "very much improved." Amongst these twenty-four cases are included some in which the only remaining symptom was an occasional attack of headache, epigastric pain, or nocturnal restlessness. In ten instances the health was "improved," but several of the former symptoms still continued, though with lessened severity. One child had died from an attack of diphtheria; he was much better prior to his fatal illness. The remaining eight cases had all improved, but had had relapses; in only two cases were they as ill as they were when first they were brought to hospital.

The prognosis in those cases in which the bowels were from the beginning regular, would appear to be better than in those in which there has been much constipation or diarrhœa.

The midday urine was examined in three of the cases of cyclic albuminuria after periods of 1 year 3 months, 1 year 6 months, and 1 year 11 months. In each case there was still a trace—but only a trace—of albumin.

TREATMENT.—Without doubt, by far the most powerful remedy for the treatment of the immediate condition is change of air. That it is the actual change of air or of surroundings, and not change of diet, that does good when the child goes from home, can be seen from the fact that alteration of the diet will have comparatively little effect as long as the child remains at home, even when kept away from school. Curiously enough, it seems to be of comparative unimportance where the patient goes, as long as he has this change. Thus one of the cases in my series lived at Hindhead, one of the healthiest spots in the south of England. Before coming to hospital he had been staying for a week with an aunt in Whitechapel, and was, his mother informed me, markedly better. The only difference in his diet in town to what he had had in the country was that in the former he had had Quaker oats for breakfast in addition to his other food. Another of the cases in my series went to Aberdeen, and whilst there, her mother told me, lived largely on sugar and sweets. She returned, nevertheless, almost quite well. As long as the children are at home and their symptoms still active, one finds that cod-liver oil, and, to an even greater extent, syrup of the hypophosphites, are not merely useless, but actually deleterious. When away for a change, on the other hand, these remedies generally seem to suit quite well.

The beneficial influence of change, as compared with treatment at home, is shown by the increase of weight in those cases sent for a change. In those who were weighed, the average gain of weight per week was half a pound; in those treated at home it was one-sixth of a pound.

A change causes not only gain in weight, but an amelioration or disappearance of all symptoms. A gain in weight does not always mean an improvement in the condition, however. By giving cod-liver oil in the early stages of treatment, one may occasionally, though not as a rule, get an increase of weight, but at the same time the digestion becomes more upset.

It is probable that the change of surroundings has as much, or more influence in causing the improvement, as has the change of air. Thus, when a child suffering from chronic intestinal dyspepsia is admitted into hospital, even when put on the same diet that he had before admission, he rapidly improves in health.

We thus see that change of air and surroundings is a powerful therapeutic agent in the immediate treatment of this disease. When the child has been two or three months in his new home, however, unless other treatment is carried out as well, the old symptoms are apt to return, and soon become almost as severe as ever. The treatment which should accompany this change of air, and which should be continued, more or less modified, for years, is regulation of the diet. We have seen that, *a priori*, it is probable that an excessive ingestion of carbohydrates is an etiological factor in the causation of the disease, and we find, practically, that it is essential in its treatment to limit their intake. Till the symptoms are greatly ameliorated, it is well to allow the child no sugar, sweets, jam, potatoes, new bread, sago, tapioca, arrowroot, Indian corn, flour, turnips, or carrots. At the same time one gives instructions to prevent the taking of obviously indigestible foods, such as pastry, and also orders the food to be taken at regular intervals, and nothing to be taken between meals. Because of the idea that one of the etiological factors in the causation of the disease might be the absence of an indigestible residue in the food; coarse brown bread and medium ground oatmeal in the form of porridge (made with salt, and not *too* long boiled) were ordered, and were found to be beneficial in most cases. The evening meal should be a very light one, and the child should go early to bed. The diet should thus consist of milk, rusk, thin toast or stale brown bread, eggs, lightly cooked fish, white meat or butcher meat; he may also have a little bacon, butter, or dripping, and green vegetables, or ripe fruit in small amount. Besides, if possible, a change and the regulation of the diet, other hygienic measures must be attended to. One of the most important of these is to ensure a sufficiency of fresh air. It is well for this reason, as well as to save him from mental worry, to keep the child away from school till he is considerably better. In a few cases, however, especially in winter, and where there are no parks in the neighbourhood in which the child can play, he may be better at school than hanging about the streets, or cooped up in a small room at home. To sleep with the window open, and to have a cold bath—with just the chill taken off it—in the morning, followed by a rub down with a rough towel, are useful. To avoid congestion of the internal organs, it is very important to keep the abdomen and the extremities warm and dry. A flannel binder and water-tight boots and thick woollen stockings are of the greatest importance in treating the disease.

The patients should be kept free from undue excitement, whether pleasurable or the reverse, and evening parties, theatres, and excessive punishment are all equally deleterious.

Amongst drugs, the most beneficial are the alkalies, oleoresins, and bitter tonics. Bicarbonate of potash or soda and citrate of potash have a markedly beneficial effect, especially when combined with nux vomica and myrrh or coto. Thus a very useful preparation is—℞ Potas. bicarb. potas. citrat. āā 10 grs., tinct. nucis vom. 4 minims, tinct. myrrh. 30 minims, infus. gent. co. ad 2 drms. t. d. a. c.

Combined with this treatment one finds that a powder containing rhubarb and soda, with a little grey powder, given every night, is of great benefit. If there is constipation, one gives sufficient rhubarb to ensure a good motion in the morning, but when the bowels are quite regular, it is still of great use in a diminished dose, and even when there is a tendency to diarrhœa, by giving a small dose one gets the astringent action of the rhubarb; thus a relaxed condition of the bowels is no contraindication to its use. Another drug of the greatest use is aloes. It is best given in the form of decoctum aloes co. When the appetite is poor, it can be given in drachm doses before meals. With this dose there is no cathartic action. When given between meals, one can give 2 drachms thrice daily, as Eustace Smith suggests, without undue laxity of the bowels; this form of administration is especially useful when the appetite is voracious. No doubt some of the beneficial action of this preparation of aloes is due to the myrrh which it contains, but one can give much larger doses of myrrh with good results. 40 minims of the tincture to a child of 8 years old can be easily borne. Coto is very useful as a substitute for myrrh, but probably is not superior to it. I have used tabloids of 1 gr. of cotoin (kindly prepared for me by Messrs. Burroughs & Wellcome) with excellent results. Its beneficial action seems to be due to the increased power of absorption which it causes (28).

Carbonate of magnesia, and, when there is diarrhœa and much epigastric pain, bismuth, are often of service. Quinine and the vegetable bitters, such as gentian, quassia, or calumba, are also found to be of use. Soltau Fenwick ([29]) has stated that in "the gastric dyspepsia of children" there is a diminished production of hydrochloric acid, and (especially as we now know that hydrochloric acid is one of the most powerful of pancreatic stimulants), it therefore seemed of use to give a dilute solution of hydrochloric acid in this malady, which was accordingly done 3½ hours after meals, without, however, any satisfactory result.

Dilute mineral acids are, however, occasionally useful where improvement has commenced; under their exhibition, when not given too early, the child usually improves in general health; he rarely, however, puts on flesh, and his weight remains stationary, or he may actually grow lighter.

Pepsin was also given in a few cases, and seemed to have a beneficial influence; it was not given in a sufficient number of instances, however, to draw any definite conclusions as to its value. Charcoal was given as a mechanical means of removing the mucus and as a stimulant to the bowel wall, and its administration was found to be of distinct service. Small doses of alcohol given before or during meals are often useful. It is best given as sherry, slightly diluted with water, or claret. Probably the beneficial effect of some of the tinctures used in the treatment of the disease may be in part due to the alcohol which they contain. Iron is not well borne while the disease is still at its height, but during convalescence it is extremely useful; it can be given in drachm doses of vinum ferri, combined with a similar dose of decoct. aloes co. When most of the symptoms have disappeared, one may very cautiously begin to give cod-liver oil or syrup of the hypophosphites, but they must be given in small doses, and their effect strictly watched.

TREATMENT OF SPECIAL SYMPTOMS.—Little need be said under this heading, for full directions for symptomatic treatment are given in every text-book on children's diseases. One or two points are, however, worthy of mention.

Night-terrors.—It is rare that special treatment is required for this symptom, but occasionally for a few nights it may be necessary to give some sedative. Antipyrin or phenacetin have markedly calmative action.

Nervousness.—If the child is excessively nervous, bromides are frequently of great use, and can be given without hesitation until the general treatment renders their further use unnecessary.

Lienteric diarrhœa.—Arsenic, in the form of minim doses of liquor arsenicalis, is generally able to control the excessive action of the bowels, and at the same time it exercises a beneficial effect on the general course of the disease. If this fail, it may be necessary to give doses of two or three minims of laudanum.

Enuresis.—Removal of tonsils and adenoids often is all that is necessary to cure the condition. Belladonna, however, even without this operation, is generally successful in stopping the habit. It must be given in ascending doses, and it may be necessary to give it till it begins to exhibit its physiological effects. To a child of eight, one can generally give—when the drug is gradually increased—up to at least forty-five minims of the tincture, thrice daily, without undue discomfort; it seems to do good also to the general condition. It is practically always successful in checking sweating at night in these cases.

Enlarged tonsils and adenoids.—In twenty of my fifty cases, either enlarged tonsils, adenoids, or both were removed. In four of these cases no medicine or instructions as to diet were given till at least ten days after the operation. After that time two of the cases had had no more night-terrors, and no longer snored, one was less languid, and one had ceased to cough. There was no improvement in the other symptoms. Ten days is, of course, too short a period in which to see the full benefit of the operation, and when the growths are large there is no doubt that their removal is strongly indicated. When their enlargement is slight, painting the throat with some astringent, or, in the case of adenoids, a nasal douche containing such remedies as bicarbonate, chloride, and biborate of soda, and, if necessary, a little chlorate of potash, will be found of great service. Removal of tonsils or adenoids will not be followed by great success, unless after the operation the child is taught to breathe properly.

By means of diet and medicines, one can probably always remove the symptoms of the disease, but it is quite the exception to get, by these means alone, a marked and rapid gain in weight, and in order to get a rapid convalescence, change of air, as already stated, is essential.

Such is a brief summary of the facts elicited from the study of a malady of profound interest, alike because of its extreme frequency and its amenability to treatment. Of necessity, my contribution to the knowledge of the subject cannot be as complete as I should desire. If others will work with me in making investigation on the lines laid down in this thesis, in time we shall arrive at a more definite knowledge of the relative importance of the factors which produce the condition. Thus we may hope to be in a position to cure, and probably to a great extent to prevent, a disease which is the cause of much needless suffering in childhood, and by the successful combating of which we will raise the physical standard of coming generations.

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CLINICAL RECORDS.

A CASE OF CHRONIC CYANOSIS, WITH POLYCYTHÆMIA AND ENLARGED SPLEEN.

By R. M. Ronaldson, M.B., *Edinburgh*.

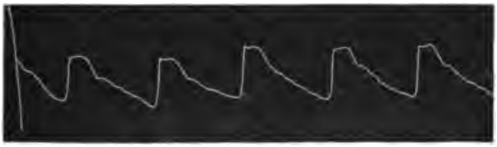
The patient is a widow, æt. 62. She has had six children, three of whom are living and in good health; one died of phthisis, one of scarlet fever, and one of heart disease. None of them ever showed any appearance of blueness.

Family history.—Her father and mother both died young, patient does not know of what.

Personal history.—She has been particularly strong and healthy all her life; she was once in bed for a short time with rheumatic pains in various joints, about twenty years ago, but does not think she was feverish. She has had no other illnesses.

Obvious morbid appearances.—The skin of the face is of a dusky purplish colour; there are numerous dilated venules over the cheeks and nose, giving the face a somewhat livid appearance; the skin of the rest of the body is redder, that of the hands being almost rose-tinted. Over the trunk there are numerous small points of dilated capillaries. The mucous membranes are of a livid red colour, the capillaries being injected. The patient says that she has been of this colour all her life. There is no clubbing of the ends of the fingers. As already stated, she has always enjoyed excellent health, but for the past two years has not been quite so strong as formerly. She is easily tired when walking, and becomes rather breathless on going up hills. She has also been greatly troubled with constipation for the past three years, and for over two years the bowels have never moved without some aperient. She sometimes feels giddy when she stoops, but not otherwise. On examining the abdomen, the abdominal muscles are seen to be exceedingly thin and relaxed, probably accounting, in part at all events, for the constipation. The edge of the liver can be felt just below the margin of the ribs. The spleen can be felt projecting about 2 in. below the ribs on the left side.

Circulatory system.—The right border of the heart extends 1¾ in. to the right of the midsternal line, the left border is 4½ in. to the left of the midsternal line at the level of the fourth rib. The apex beat is diffuse, its maximum intensity being felt under the sixth rib 4¼ in. to the left of the midsternal line. The first sound is sometimes reduplicated in the mitral area, the second sound is somewhat accentuated in the pulmonary area; there are no murmurs. The pulse is 80, somewhat irregular; the arteries are distinctly thickened and tortuous. The blood pressure is between 180 mm. and 190 mm. Hg, as estimated by Hill and Barnard's sphygmometer. There has never been any œdema of the feet. The lungs are quite healthy, she has never suffered from any lung affection. The urine has a specific gravity of 1011, acid reaction; there is a very faint trace of albumin, and few hyaline casts. Urea, 6·5 grs. per ounce, 403 grs. per diem; there is a very large amount of urochrome and of urobilin present.



Blood.—My first examination of the blood gave the following result:—Red cells, 9,175,000; Hb, 130 per cent.; the blood was very dark in colour, and spread very slowly over the slide on making a film, being manifestly more viscid than usual. Dr. Gulland kindly made a more detailed examination for me later. His report was—Red cells, 8,152,000; Hb, 145 per cent.; colour index, 0·9; white cells, 8800; differential count of whites—polymorphonuclear neutrophiles, 77 per cent.; lymphocytes, 23 per cent. Glycogen reaction distinct, though not marked. Films show nothing special in the red cells, a few rather smaller than usual, but no poikilocytosis to speak of; no nucleated red cells; blood plates numerous. Dr. Gulland suggested that the high percentage of polymorphonuclear neutrophiles and the positive glycogen reaction might have been due to the fact that she was suffering from a bad "cold" when the examination was made.

This case seems to be very similar to those recorded by

Vaquez (1), Cabot (2), M'Keen (3), Saundby and Russell (4), Osler (5), Parkes Weber and Watson (6), and, I think, goes some way towards confirming the idea put forward by Saundby and Russell, that we have here to do with "a definite clinical entity, and one which is new to medical science." It differs from all the other cases so far recorded, in the very important fact that the condition has apparently been present during the entire life of the patient. The cyanosis in these cases is, in all probability, secondary to the polycythæmia. Malassez (7) and Gibson (8) have shown that the blood in the capillaries contains a larger proportion of red cells than that in the arteries, the reason probably being that the red cells, being the heavy elements in the blood, lag behind where the stream is slowest and the pressure least, namely, in the capillaries and veins; the larger the proportion of red cells, the slower will they pass through the capillaries, and the more completely will they be deprived of their oxygen. As soon as there is sufficient polycythæmia to make the blood so viscid as to cause undue delay in the passage of the red cells through the capillaries, we get cyanosis.

In this case there is undoubtedly some enlargement of the heart, probably hypertrophic, and produced to overcome the resistance offered to the circulation of a much denser blood than normal. There is no leakage at any of the valves, nor has there ever been any signs of cardiac debility, such as dyspnœa, œdema, etc.

The cause of the polycythæmia is more difficult to explain. The idea of a diminished rate of destruction of the red cells may be dismissed; this case shows evidence of excessive destruction; the urine, which was not concentrated, there being 62 oz. in the twenty-four hours with a specific gravity of 1011, contained a very large quantity of urochrome and urobilin.

There must be an excessive rate of production of red cells, probably compensatory, but for what we can only speculate. There is no evidence of any need for an excessive supply of oxygen, and in none of the cases has the percentage of Hb risen in anything like the same proportion as the red cells.

Everything seems to point to the excessive number of red cells being required to fulfil some function other than mere oxygen carriers, and with which we are as yet unacquainted.

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A CASE ILLUSTRATING SOME POINTS IN THE TREATMENT OF MOVABLE KIDNEY.

By H. M. W. GRAY, M.B., F.R.C.S.Ed., *Surgeon, Aberdeen Royal Infirmary.*

CASE.—A female patient, about four years before she came under my charge, was operated on for movable kidney. She was much relieved for two years, but after this time there was a gradual return of symptoms similar to those from which she had previously suffered. Four weeks before I saw her she had a fall, after which the symptoms became much exaggerated. She complained of great pain in the right side, especially on exertion. It became much aggravated if she remained long in an erect posture. It was relieved after lying down for a time. She had attacks of severe retching, and had fainted on several occasions. She had frequency of micturition during the attacks, and stated also that at times she was suddenly compelled to pass a largish quantity of urine, after which the pain would sometimes be relieved a little. In very severe attacks, there was occasionally a little blood noticed in the urine. Her life was made miserable by her condition, and, in addition, she suffered much from sleeplessness.

She was rather corpulent, which condition hindered accurate palpation. She complained of great tenderness over the right side of the front of the abdomen external to the outer border of the rectus abdominis. Tenderness was also present, to a less extent, in the loin posteriorly, below the scar of the first incision, which had evidently been the usual oblique one parallel to the twelfth rib. It had retracted upwards till it was now over the eleventh rib. Tenderness was most marked over an oval area, 2 by 3 in., just above the level of the umbilicus and close to the outer border of the right rectus muscle.

Examination was unsatisfactory. Only very occasionally, when the patient was persuaded to take a deep breath, was there any suspicion of mobile kidney, and that rested chiefly on the increase of tenderness during inspiration while the hand was pressed back into the region of the kidney. (Murphy's test for cholecystitis positive?) The discomfort *might* have arisen from an inflamed gall bladder.

Examination under chloroform gave no more help. Nothing abnormal was felt in the pelvis on vaginal examination, except slight fissuring of the cervix uteri and a relaxed perineum.

There was no blood, pus, or other abnormality in the urine.

I operated on 4th December 1903. The usual incision for exploring the kidney was made, and I found the deep scar of the first operation in the muscles under my skin incision. The right kidney was found to be apparently firmly fixed to the abdominal parietes by very strong fibrous adhesions. There were also two dense fibrous bands stretching across the front of the ureter about 1 in. below the kidney. Only the lower part of the kidney was at first palpable. On further examination, I found that the upper three-fourths were quite free from adhesions and were covered by perinephric fat. While I was palpating this part, the kidney swung suddenly downwards and forwards until its upper pole was pointing to the opposite iliac region. The case was now clear. It was quite conceivable that, in the erect posture, especially on exertion, when the diaphragm would be forcibly contracted, the kidney would assume the position I have described. The dense band of adhesions was fixed, at its inner end, to the lower pole and adjacent outer margin of the kidney, while the outer end was fixed to the abdominal wall opposite to the twelfth rib. Round this fixed point the kidney rotated. This position caused kinking of the ureter at probably two points.

The peritoneum was opened externally to the ascending colon, in order to examine the gall bladder and appendix. Both were normal. The liver was not enlarged, but its under surface was studded with hard nodules, the size of a split pea and greyish in colour. The peritoneum elsewhere was normal. The nodules did not strike one as being either tuberculous or malignant. The peritoneum was sutured with catgut. The kidney was freed from adhesions. The capsule had to be incised at the lower part and shelled off where the very dense fibrous band was attached. There was only slight bleeding from the exposed cortex, which soon stopped spontaneously.

The fibrous bands over the ureter were divided. The perinephric fat between the posterior surface of the kidney and the abdominal wall was removed, and strips of gauze were packed round the kidney, leaving the pelvis of the kidney quite free. The ends of the gauze strips were brought out of the posterior part of the wound, the rest of which was sutured. These gauze strips were kept in position for seven days. They were then removed under gas anæsthesia, and a thick drainage tube inserted down to the kidney. This was removed a week later.

The patient lay on her back for a month. She was quite relieved of her symptoms except the sleeplessness, and had been able to return to her ordinary duties, for which she was previously incapacitated.

I consider this an interesting and instructive case. By many the operation of nephropexy is regarded as rather futile. Perhaps this is not entirely without justification, as the operation is followed, in my opinion, by an unnecessarily large number of failures. One finds in these, either that the kidney has become as movable as before the operation, or that, while the kidney remains apparently fixed, the symptoms become as bad or even worse than before. The latter was the case in my patient.

Failure to fix the kidney is due chiefly, I think, to neglect of a very simple but very important point during the operation. I have hunted English text-books in vain for any weight being put on the necessity for removing the layer of perirenal fat which exists between the kidney and the abdominal parietes. American surgeons have recently laid much stress on this point. *If* a pad of fatty tissue be left between the kidney and the comparatively fixed abdominal wall, I do not see how success *can* be expected, however cleverly sutures be inserted to hold the kidney. To ensure success the posterior perirenal fat must be cut or torn away. In spite of the methods suggested recently for inserting sutures to fix the kidney, I see no reason to alter the method I have invariably used. It is simpler and easier of performance than any other that I know. It is akin to Senn's method, and was suggested to me on reading of it. He advocated gauze slings around each pole. Owing to the prolonged presence of the gauze strips around the kidney, granulation tissue is formed to a considerable amount, and the transformation of this into fibrous tissue ensures firm adhesion of the whole of the convexity of the kidney to the surrounding parts, most important, of course, being the adhesions to the abdominal wall. Where decortication is practised extensively enough, a similar result is obtained, but here again only if the perirenal fat is removed.

The second principle indicated by the case is avoidance of the use of slings or special supports to the lower part of the kidney. These produce, no doubt, very strong fixation of the lower part, but unless similar fixation of the upper part is secured, we see what can happen and what severe symptoms may result.

During the past three or four years I have made a constant practice, in such cases where any doubt in the diagnosis exists, of opening the peritoneal cavity along the outer side of the ascending colon, and palpating the gall bladder, bile ducts, pylorus, appendix, and broad ligament. There is often difficulty in coming to a decision as to whether the symptoms are due entirely to the presence of an abnormally movable kidney, or whether the case is complicated by the presence of biliary trouble, pyloric adhesions, appendicitis, or ovarian disease. Palpation of these parts, easily carried out from the wound in the loin, will settle the matter.

REVIEWS OF
BRITISH AND FOREIGN LITERATURE.

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Blood Pressure in Surgery. By **GEORGE W. CRILE**, A.M., M.D., Professor of Clinical Surgery, Western Reserve Medical College, Cleveland. Philadelphia and London: J. B. Lippincott Company.

DR. GEORGE W. CRILE published in 1899 a volume, entitled "An Experimental Research into Surgical Shock," for which he had been awarded the Cartwright prize for 1897. Those who have studied that work, and appreciated the scientific spirit of the investigator, will welcome this new work from the pen of the same author. The first sentence in the introduction gives the *raison d'être* of the research. "Investigation of the views as to the various causes of low blood pressure in surgical cases, and of the methods employed in controlling the same in the various clinics of the surgical world, reveals a diversity of opinion as to the former and a diversity of method as to the latter. One may say, indeed, that each surgeon holds distinctive opinions." Two hundred and forty-three dogs were experimented upon, and all the data derived have been published, and occupy 250 pages. The results were continually subjected to a clinical comparison in the author's active surgical practice. To those investigators who undertake a similar research, the detailed data should prove most instructive, and should obviate much laborious experiment; but to the clinician, the last portion of the book will be of chief interest. In the last 150 pages the results of the experimental work are given and contrasted with those observed clinically in operative surgical work.

In *shock* the essential phenomenon is a diminution in blood pressure. To what is this due? The heart and its nerve mechanism may be excluded as factors in the primary causation. The loss of peripheral resistance is the essential factor, and may be from—(1) Exhaustion of the peripheral nerve vascular mechanism, or (2) exhaustion of the vasomotor centres. The latter is almost certainly the essential cause. How it is to be prevented, or, when it has occurred, how it is to be remedied, are the practical objects of the author's experimental research. The effects of the various drugs most frequently exhibited to prevent or remedy shock have been carefully tested. *Strychnine*, in therapeutic doses, is a pure vasomotor stimulant, and increases the blood pressure to a remarkable degree, but when continued it exhausts the vasomotor centre, and in effect produces shock. "It would be as reasonable to treat strychnine shock by administering traumatism as traumatic shock by strychnine." *Normal saline solution* is a purely mechanical aid to the circulation. It is not retained in the blood vessels, but passes into the tissues and alimentary canal. *Adrenalin* causes a marked rise in blood pressure. It is rapidly oxidised, however, in the tissues, and is most effective when given intravenously. It requires to be given continuously, and when combined with saline solution is valuable.

Collapse is the term applied by the author to cases in which the fall in the blood pressure is more sudden than in shock, as in profuse hæmorrhage, or from injuries of the vasomotor centres, or from cardiac failure. It is suspension of function rather than exhaustion of centres, and in it the most favourable results are got by artificial respiration and saline intravenous infusion. Stimulants are, however, of value in collapse, as they induce renewed activity in the centres which are not exhausted. In shock, on the contrary, stimulants are contra-indicated, while peripheral pressure may replace the controlling action of the exhausted centres. To do this Dr. Crile has introduced a pneumatic suit.

The subject of this essay is one of the most difficult in surgical pathology, but one of the most important in clinical work. Surgeons owe a debt of gratitude to the author for his laborious investigation, the results of which, set forth in a lucid and interesting manner, should go far to guide them to the best treatment to adopt in a grave disease.

David Wallace.

Diseases of the Gall Bladder and Bile Ducts, including Gall Stones. By A. W. Mayo Robson, F.R.C.S., assisted by J. F. Dobson, M. S. (Lond.), F.R.C.S. Third Edition. London: Baillière, Tindall & Cox.

The first edition of Mr. Mayo Robson's work on "Diseases of the Gall Bladder and Bile Ducts" was published in 1897, and the second in 1900. Since the second edition was written, the advances have been so great in the pathology of these diseases, and the improvement in the technique of the various operations has so progressed, that this, the third edition, is almost a new book. The author's work in this, as in other branches of surgery, is so well known, that any further addition by him to the literature of the subject does not require praise from the pen of another to recommend it to the profession. This book is not merely the result of the author's wide personal experience, but, until we reach the last 150 pages, where the cases upon which he has operated are summarised, places before the reader, in addition, a wealth of knowledge derived from the work of others in the same field. Reference is constantly made and full credit given to the operative work of Greig Smith, Kehr, Mayo (W. J.), Rutherford Morison, and others.

In the operative technique we observe Mr. Robson again emphasises the value of a "sand bag, about 18 in. long by 6 in. wide and 3½ in. deep, placed at the liver level, which pushes the spine forward, and with it the liver and bile ducts, so that they are several inches nearer the surface. By opening out the costal angle and making the intestines slip down, it acts as the Trendelenberg position in pelvic surgery." To open the cystic duct or the common duct, and, if need be, drain through them, is recommended, rather than that great manipulative efforts be made to remove a stone or stones through the gall bladder.

If criticism be permissible, where success has been so great, we would suggest that more weight should be attached to the importance of packing, especially in cases of infective cholangitis. To shut off, as can be done, the surrounding peritoneal cavity, is better than to trust to "inserting a sponge in the kidney pouch and rapidly mopping up the bile as it flows."

To physicians and surgeons who desire a book of reference or guidance in this important subject, Mr. Mayo Robson's work will prove invaluable. To recommend it is unnecessary—the name and reputation of the author are sufficient. DAVID WALLACE.

A Manual of Surgical Diagnosis. By JAMES BERRY, B.S., F.R.C.S., Surgeon to and Lecturer on Surgery at the Royal Free Hospital. London: J. & A. Churchill.

THE author states in the preface to this work on surgical diagnosis, that it is intended mainly for dressers and junior practitioners, and that it is difficult to write of surgical diagnosis as a separate entity. The latter statement is undoubtedly true, and the work before us is illustrative of the difficulty. The innumerable statements regarding the symptoms and signs of surgical affections are accurate, yet they are given in such a brief and sketchy manner that their value to the dresser or junior practitioner must be of the scantiest. It is difficult to see how this work can serve any useful purpose. DAVID WALLACE.

Modern Surgery, General and Operative. By J. C. DA COSTA, M.D. Fourth edition. Philadelphia and London: W. B. Saunders.

THE increase in the size of this volume, to more than double that of the earliest edition, is an indication of the work required to keep a text-book abreast with modern surgery. By numerous and recent references to a large number of authors, the information is here kept well up to date; indeed, the constant references make the book rather resemble a compendium. As regards the scope and arrangement, however, some criticism may be offered. The aim has been to include not only systematic but also operative surgery, the latter in a form suitable for use in an operative class. All the operations in connection with each group of tissues are, therefore, collected at the end of the corresponding chapter; the disadvantage of this method is that a student, who is looking up a pathological condition, say club-foot or knock-knee, finds only a few lines on treatment under that heading, and must refer to the chapter on tendons for the tenotomy operation, and to that on bones for the osteotomy. There is a tendency under such conditions as inflammation, erysipelas, and the like, to multiply sub-divisions; thus, inflammation is classified into twenty-eight distinct forms. The author takes up strongly the position that inflammation is by no means necessarily organismal, a view which influences his statements on the causation of many surgical affections — perinephritis and periostitis arising from cold, cystitis from the passage of a "clean sound," and so on. Leucocytosis and massage are worthy of more attention than the few lines which they receive. Fractures are very properly dealt with in considerable detail. One notices that the author does not believe in comparatively early movement in fractures near joints, holding that movement results in the formation of more callus and consequent stiffness, and he delays for three or four weeks in the case of the larger joints. The histology of tumours and other pathological conditions is not discussed at any length—a wise omission where compression is necessary. For the same reason the special branches of surgery—gynæcology, laryngology, etc.—are not touched upon, but surely adenoids and diseases of the tonsils should still be mentioned in a book on general surgery. Appendicitis is clearly and succinctly discussed, and so are the various abdominal operations; but would one wait for reaction, after diagnosing a perforation of stomach or intestine, before performing laparotomy? There are useful chapters on Röntgen rays, bandaging, and anæsthesia; under local anæsthesia, however, no mention is made of the method of adding adrenalin to cocaine or eucaine. The illustrations are numerous, and, as a rule, very good.

It is impossible to attempt to compress surgery, systematic and operative, into a volume of 1100 pages, without affording opportunities for criticism. But while of the opinion that in some ways the general arrangement and certain of the classifications and descriptions throw unnecessary difficulties in the path of the student, one must regard this volume as fully entitled to maintain its position as a valuable text-book on the subject. W. J. Stuart.

Surgical Lectures and Essays. By A. Marmaduke Sheild, M.B. (Cantab), F.R.C.S. London: The Medical Publishing Company Limited.

In this small volume Mr. Sheild has reprinted a number of clinical lectures and addresses delivered at St. George's Hospital and before various medical societies, during the last ten years. We gather from the preface that most of these have already appeared in an isolated form. There are comparatively few papers of this ephemeral class which will bear the crucial test of republication; and while we are not sure that all those included in the volume before us reach the required standard, we do not regret that the author has thought otherwise. In the articles on "Operations on the Larynx," "Goitre and its Treatment," and "Iliac Abscess," for example, there is much that is interesting and instructive, and of permanent value. The various papers on "Surgical Affections of the Breast" also repay careful perusal, as indeed does all that Mr. Sheild writes on this subject. We feel, however, that, without serious loss, the contributions on the modern treatment of fractures might have been omitted. With most of what Mr. Sheild says on this subject we find ourselves in complete agreement, but in the light of more recent work there is much that is open to criticism. Doubtless the author has modified his views to some extent since these papers were originally printed.

In reading papers such as these, it is necessary to bear in mind the conditions under which they were originally delivered, and to allow a margin for that degree of dogmatism which a teacher must introduce to render his message convincing to his pupils. This circumstance precludes detailed criticism by the reviewer of the opinions expressed and the advice offered. The author's style is clear and lucid, and at times racy; but what does he mean when he says, in inculcating the importance of students studying trivial injuries (p. 202), that "All must fly before they can swim"? We do not see the necessity.

ALEXANDER MILES.

Text-Book of Pathology. By ALFRED STENGEL, M.D., Professor of Clinical Medicine in the University of Pennsylvania. Fourth Edition. Philadelphia and London: W. B. Saunders & Co.

THIS edition has been considerably enlarged, and extensive changes have been made. In deference to certain criticism upon past editions, the author has added an appendix of about 40 pages, in which he describes the most important methods at present in use in the practical study of pathology. It is a useful résumé of pathological technique, and may be found useful by some. Most workers will probably prefer to consult a more detailed guide when in need of help. The chief of the other changes in this edition have been made in the part dealing with General Pathology. The subject of Immunity has been recast and largely rewritten. The present account is really an excellent one, being simple, clear, and concise. So rapidly, however, does this subject march, that already it is incomplete on a few points. Inflammation is another subject which has received fresh treatment in Chapter v. It states the facts well, but it may be further improved by having a little greater space allotted to it. A good account is given of bacteria and the diseases to which they give rise, but no distinction is drawn between bacteria which act by secreting toxins outside their own bodies (extracellular) and those which form intracellular poisons only. Among the pathogenic bacteria, the only members which secrete extracellular toxins are diphtheria and tetanus, to which may be added the bacillus botulinus, the cause of meat poisoning. The toxins of these organisms cause their specific diseases, and can be antagonised by their specific antitoxins. On the other hand, the poisons of all the other bacteria pathogenic to man, *e.g.* typhoid, tubercle, etc., are intracellular and cannot be antagonised by an antitoxin, because the latter cannot reach them until the bodies of the bacteria themselves have been dissolved. The phenomenon of bacteriolysis has been carefully described in the book, but the important bearing which this difference in toxin formation has upon the question of serum therapeutics has been missed. A serum is of no value unless it contains the specific immune body of the animal to which it is given. If it does, it enables the compliment to destroy the bacterial body and its poison, but there is the risk that, if it contains more immune body than compliment, the excess of the former may fix all the latter and leave the bacteria themselves freer than before and more capable of mischief. Hence such a serum, instead of doing good, will do harm. It is this difficulty which places serum therapeutics in the great bulk of bacterial disease on a very different platform from that which it occupies in diphtheria, tetanus, botulism, and snake-bite. Improvements have also been made in the account given in the book of the diseases of the blood and several other sections. Several new illustrations have been introduced, and altogether the present edition will be found to be even more valuable than its predecessors.

R. F. C. Leith.

Handbook of Surgical Anatomy. By G. A. Wright, B.A., M.B. (Oxon), F.R.C.S., and C. H. Preston, M.D., B.S. (Lond.), F.R.C.S., L.D.S. (Eng.). London and Manchester: Sherratt & Hughes. 1903.

We extend a cordial welcome to this small work, which contains a judicious and useful selection of the more important points in anatomy, and illustrates their application to practical surgery and medicine. As the authors remark, "all anatomy is in a sense surgical and medical," but the plan upon which our anatomical text-books and manuals of dissections are necessarily arranged, renders it difficult to bring clearly before the student the relative practical importance of the different structures from the point of view of the operating surgeon and the clinical physician. This our authors have attempted to do, and, in our opinion, with a marked degree of success. The first section is devoted to a description of the upper extremity, the parts being described from below upwards, beginning with the pulp of the finger, and ending with the bony points about the shoulder. The lower extremity is described in the opposite direction—from the thigh towards the toes. The reason for this difference is not apparent to us. Personally we prefer the order adopted in the lower extremity, which appeals to us as being more natural and systematic. It seems easier for the student to follow the description of the blood vessels and nerves from above downwards, and of the muscles from their origins to their insertions, than in the opposite order. The authors are not without authority for this variation in arrangement, as it has been adopted by Mr. Jacobsen in his work on *The Operations of Surgery*, a fact which may not have been without influence on Mr. Wright. The sections on the abdomen and pelvis embody most of the modern descriptions of the viscera. The pages devoted to the description of the teeth are particularly useful. The work is not illustrated, in this particular following the example set, we think, by Holden in his *Surgical Landmarks*, with the object of compelling the student to resort to nature for the verification of the facts.

Alexander Miles.

Gynæcology: a Text-book for Students and a Guide for Practitioners. By William R. Pryor, M.D., Professor of Gynæcology in the New York Polyclinic Medical School. 163 Illustrations. New York and London: D. Appleton & Co.

The author states in his preface that this work is limited to purely gynæcological topics, all references to bacteriology, minute anatomy, rare diseases, and bibliography being omitted. The book is divided into two sections. The first deals with a description of the individual diseases, the second with an account of their operative treatment. With regard to the former, the chapters are for the most part clear, practical, and concise. Throughout the book important deductions are printed in small capitals. In the section dealing with the operative treatment of cancer of the uterus, Pryor gives preference to the abdominal operation, and when this is inexpedient he prefers supravaginal amputation to total vaginal hysterectomy. In advanced cases he believes suffering is diminished and life prolonged by opening the abdomen and ligaturing the ovarian, iliac, and obturator arteries. In the chapter on hæmostasis he believes that angeiotripsy has never become very popular and is being less used than at first. Perhaps the outstanding feature of this book is the excellence and clearness of the illustrations, especially those which show operative technique. J. A. C. Kynoch.

The Practice of Obstetrics. By J. Clifton Edgar, M.D., New York. London: Rebman Limited.

Of late years several treatises on the subject of obstetrics and diseases of women have been given us by American authors, some of them of high merit and most of them distinguished by their wealth of illustration. Some of these, as is the case with the well-known text-book on obstetrics, edited by Dr. Norris, were by a number of writers. The volume under review, whilst equalling or even exceeding the above work in size, comes entirely from the hands of Dr. Edgar, and it is difficult to say which one admires most—the energy which could complete a volume of over a thousand pages, or the skill with which the material has been selected and presented. In range of subjects it has probably not been equalled in any treatise, and one cannot speak too highly of the illustrations. There are over 1200 of these, and though they are not all original they have been chosen from the best possible sources. There is scarcely an indifferent one amongst them, nor one that does not show clearly the condition it is meant to represent.

It is difficult, within a short compass, to do justice to a work of this size. The tendency is to lay stress on such portions as are weaker than others, or to dissent from views with which one is not in sympathy.

The pathological sections are on the whole admirably treated, and special reference may be made to the chapters on the diseases of the decidua and chorion, and to the very full account of monstrosities and antenatal diseases.

In the physiology of the female genital organs is included a section on rape, based on an extensive experience of the subject, and of considerable medico-legal importance.

The mode of attachment of the ovum to the uterine wall, by a process of boring into the mucosa, is not described. A good account, however, is given of the essential features that distinguish the development of the early human ovum, with some useful plates after Graff Spee, illustrating some of these points.

In the section on physiological pregnancy, attention may be drawn to the excellent description of the various changes undergone by the uterus in the course of pregnancy, and the admirable series of illustrations that accompanies it, to the article on the duration of pregnancy, and that on pelvimetry and cephalometry.

The treatment of placenta prævia is considered at some length. The fulness of detail and an attempt on the author's part to be fair to all methods, tend rather to obscure his own line of treatment and to make the whole subject difficult to follow. It is curious to read that "the Braxton Hicks' method of bipolar version is recommended by some authorities as an ideal procedure." Dr. Edgar certainly recommends it under certain circumstances, but he apparently prefers manual dilatation of the cervix and the application of forceps. He states, further, that a case should never be left to natural expulsion, after version has been performed, a statement that would not receive wide support in this country. On the subject of accidental hæmorrhage, no reference is made to the work and views of the Dublin school. Here again the author, in severe cases, performs rapid delivery, after manual dilatation of the cervix. He gives, however, no idea of the degree of severity that would justify one in resorting to this mode of delivery. However justifiable these methods are in skilled hands, there can be little doubt that they would result in grave and unnecessary harm to patients at the hands of the inexperienced. He advises resource to the same procedure in all cases of eclampsia, nor does he agree with Charpentier and others, who held that forced labour should be reserved for exceptional cases in which other methods of treatment have failed. Opinions differ so much on the question of emptying the uterus in eclampsia, that it is difficult to quarrel with the above treatment, however much one may disagree with it personally. It indicates, nevertheless, the same tendency that one finds in so many American and continental works to extreme lines of treatment.

One subject of importance, that may be referred to as unsatisfactory, is ectopic gestation. A reader of this chapter would scarcely suppose that such a thing as tubal abortion and the formation of a hæmatocele occurred. Very little attempt is made—either in symptoms, diagnosis, or treatment—to distinguish between the various stages of an ectopic gestation and the accidents to which it is liable. All that we are told in reference to the early period of gestation is, that after rupture immediate laparotomy is called for. In the space devoted to this subject Dr. Edgar might reconstruct it with advantage in a subsequent edition.

The author gives sound practical details in all that relates to the management of labour. Though he recognises the opposition that exists to the rotation of the head with forceps, in cases of unreduced occipito-posterior presentations, he has practised it, without having reason to repent it, for many years. There is no doubt that this mode of rotation carries with it certain risks, in the hands of the inexperienced especially, that do not attend manual rotation, and it seems scarcely wise in a text-book to recommend it in place of the latter.

It is impossible in a short review to give an adequate impression of the scope and the wealth of information contained in this book, or to indicate, as one would wish, the features of interest and importance that are to be met with. It is the most thorough work on the theory and practice of gynæcology that exists in the English language, and Dr. Edgar is to be congratulated on bringing to a successful conclusion a work of such importance.

G. Bellingham Smith.

A System of Physiologic Therapeutics. Edited by Solomon Solis Cohen, A.M., M.D. London: Rebman Limited.

This important contribution to medical literature consists of eleven volumes, the publication of which, commencing in 1901, has extended over three years. It is described in the sub-title as "A Practical Exposition of the Methods, other than Drug-giving, useful in the Treatment of the Sick," and embraces therefore a wide variety of subjects, but, contrary to what might be expected from the foregoing definition, fails to include surgery and midwifery. The title "Physiologic Therapeutics" is also perhaps not very happily chosen. The editor states that "By natural or physiologic therapeutics is meant the utilisation, in the management of the sick, of agencies similar to those constantly acting upon the human body in health; but, because of some departure from health, needing to be specially exaggerated or localised in their action." The work is largely devoted to a consideration of the applications of electricity and physical and mechanical methods in the treatment of disease; but mineral waters, for instance, are really drugs in certain combinations, while the electro-cautery, cystoscopy, cataphoresis, inhalation of creosote and similar volatile substances, the disposal of sewage, and many other procedures described, scarcely come under the definition of "agencies similar to those constantly acting upon the human body in health." In attempting to establish a hard-and-fast line between various therapeutical measures, the editor has probably attempted the impossible, as, from the very beginnings of medicine, successful treatment of individual cases has always been recognised as depending on a combination of measures of very various kinds and importance, rather than on adherence to rigidly exclusive methods.

The present work consists of a series of more or less exhaustive monographs, the preparation of which has been assigned by the editor to well-known writers on each subject; and in many cases further subdivision has been considerable, so that the methods described and the opinions expressed are those of men possessing special knowledge. The volumes have been liberally illustrated to elucidate the text, and this adds greatly to their value, as much of the apparatus and many of the procedures are outside the ordinary limits of medical school teaching, and are probably unfamiliar, in their practical application at least, to the bulk of practitioners. In his preface, the editor states that this is the first work of its kind published in the English language, and points out that the methods of treatment described in it have been comparatively neglected in English-speaking countries, hence his aim has been to make it as practical as possible and suited to the daily needs of medical men. In many cases, however, the different contributors can scarcely be said to have lived up to this ideal, owing doubtless to the constant temptation, which seems to beset specialists, of enlarging diffusely on all aspects of their subject. The participation of so many contributors has also involved a certain amount of repetition, but this is a very minor defect, inevitable in the circumstances. These volumes fill a gap which has hitherto existed in English therapeutical literature, and on the whole they compare quite well with many other "systems" treating of medical subjects. In the first volume, Dr. George W. Jacoby describes the apparatus and methods employed in electrotherapy, this being preceded by an exposition of elementary principles. The more important instruments used for diagnostic and therapeutical purposes are clearly described and their practical application explained. There is a short account of the Röntgen rays. In volume ii. the same subject is continued, a large space being devoted to the physiological effects of electric currents, followed by a few pages on their therapeutical uses. Volumes iii. and iv., by Dr. F. Parkes Weber, with the collaboration of Dr. Guy Hinsdale, are devoted to climatology, health resorts, and, incidentally, mineral springs. The general questions as to temperature, moisture, light, humidity, classification of climates, and similar matters, are discussed in a very interesting fashion, while the management of patients at health resorts, mineral waters, bathing, and sanatorium treatment, receive adequate notice. The enumeration and short imperfect descriptions of a very large number of spas and other resorts become very wearisome, and are more suited for a guide-book or list of such places than for a scientific treatise on their therapeutical value. The next volume is entitled, "Prophylaxis, Personal Hygiene, Civic Hygiene, Care of the Sick," and the preface describes it as an introduction to the science of medicine, and of special importance in relation to the prevention of disease. It deals largely with the special provinces of the medical officer of health, the sanitary inspector, and the sick-nurse. The section on prophylaxis is by Drs. M'Farland and Babcock, and consists of a series of short articles on immunity, infection, inoculation, heredity, and other matters. Parasites as a cause of disease and infectious disorders are dealt with at greater length, while ptomains, toxins, prevention of infection, and disinfectants are also noticed. The whole forms a somewhat popular but clearly worded essay on elementary public health. Volume vi. is by Dr. Nathan S. Davis, and is entitled "Dietotherapy and Food in Health." He devotes a large space to the physiological aspect of the question, making ample use of Professor Atwater's valuable researches; the chief articles of food are considered at some length, the dietaries of different races and classes are discussed, and the value of alcohol and similar additions is duly weighed. The knotty points are to a large extent avoided, but as a compensation the whole makes easy and pleasant reading. In the second part, diet in disease and the special dietaries suited to a large number of diseases are fully considered. Mechanotherapy, physical education, massage, and exercise are treated by Dr. John K. Mitchell. There is a careful account of general massage, the manipulations being explained by means of many illustrations; the effect on the body as a whole and on the various organs is described; and indications are given for its use in rest treatment, and in chorea, neurasthenia, anæmia, heart disease, obesity, and many other morbid states. Attention is drawn to the valuable method of treating fractures by massage, and to its other surgical applications. Exercises of the muscles and joints, as remedial measures, are treated of at some length, and Ling's, Zander's, and other systems are described. The methods of Schott and Oertel for the treatment of heart disease receive a very fair critical exposition.

The value of gymnastic exercises in improving the general vigour and development of the individual is discussed by Dr. Gulick, and an account of numerous orthopædic appliances finishes the volume. The next of the series is a disquisition by Dr. Francis X. Dercum on "Rest, Mental Therapeutics, Suggestion." Part of it deals with the treatment of insane persons by means of drugs, restraint, feeding, isolation, etc.; the other parts are more largely based on opinions than on observed facts. The description of the methods of hydrotherapy has been entrusted to Professor Winternitz of Vienna and his assistants. The style is involved, difficult to follow, dull, and somewhat pedantic. This may be due to its being a translation, but there is no excuse for the grave stating of such a truism as the following, which is only one of many: "Water, when introduced into the stomach, is actually taken up by the body. It remains in relation with the body for a considerable period of time." The detailed descriptions leave little to exercise the imagination or common-sense of the reader. The therapeutical uses of light and heat are discussed by Dr. Kellogg, while the important subject of mineral waters has been entrusted to Dr. Kisch. Volume x. is entitled "Pneumotherapy, including Aërotherapy, and Inhalation Methods and Therapy," and is by Dr. Tissier of Paris. Commencing with a short historical introduction, the author proceeds to give a very complete and interesting account of the physical and chemical properties of air, and the effects produced by alterations of atmospheric pressure. Caisson disease, mountain sickness, aëronauts' disease, and adaptation to high altitudes are discussed. Differential pressure methods, respiratory gymnastics, vaporisers, nebulisers, inhalers, and other similar matters, are described in detail, and considerable space is devoted to the drugs used in connection with inhalation methods. Probably most of us would find the actual therapeutical results a little disappointing in practice, compared with the description of them. The eleventh and final volume is yet to be published. Its contents comprise serotherapy and organotherapy.

RALPH STOCKMAN.

NOTES ON BOOKS.

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Mr. Hurry Fenwick's *Ureteric Meatoscopy in Obscure Diseases of the Kidney* (J. & A. Churchill, London) is a valuable contribution to the literature of urinary surgery, and will do much to arouse a wider interest in this diagnostic procedure than has hitherto been taken in this country. The work is essentially clinical, and is the outcome of a wide practical experience in the use of the cystoscope. The appearances of the ureteric orifice under different pathological conditions are figured from photographs, and the illustrations make very clear the excellent chapter on "clinical inferences" to be drawn from the examination of the interior of the bladder. This work should find a place in the library of all who practise urinary surgery.

Mr. Herbert T. Herring says, with some degree of truth, we fear, that, in the hands of many surgeons and practitioners, urinary surgery, so far as the passage of urethral instruments is concerned, "remains where it was before the great Listerian principles were propounded." His work on *The Sterilisation of Urethral Instruments* (H. K. Lewis, London) is an honest, and we think successful, attempt to enunciate certain simple rules and procedures by which not only the surgeon, but even the patient himself, may, almost with certainty, avoid infection of the urethra and bladder by means of impure instruments.

Dr. Alexander Francis's *Asthma in relation to the Nose* (Adlard & Son, London) is a plea for the treatment of asthma by cauterisation of the septal mucous membrane with a view to "restoring the stability of the respiratory centre." The first fifty-eight pages contain the author's contentions in favour of this method of treatment, and the remaining seventy-eight pages are devoted to brief notes of 402 cases in which the plan has been adopted.

The twenty-first volume of the *Transactions of the American Surgical Association* (1903) furnishes ample evidence of the high standard which American surgery has reached. Many of the papers here collected have already appeared in various periodicals, and abstracts of several of these have been published in our pages. It would be invidious, where all are so good, to select individual papers for special mention; suffice it to say that this collection of papers cannot be neglected by anyone who desires to be abreast of surgical progress.

The latest volume of *Progressive Medicine* we have received (Vol. IV., December 1903: Rebman Ltd., London) maintains the high character of this publication as a digest of advances in medical and surgical science. It would be invidious to select any one section for special praise, but we may indicate that the "Practical Therapeutic Referendum," by Dr. H. R. M. Landis, is calculated to help the practitioner in the selection and use of recent preparations. The completeness of the index is also a commendable feature of this work.

We can also recommend *Saunders' Year-Book of Medicine and Surgery*, edited by Dr. George M. Gould (W. B. Saunders & Co., London and New York). We have before us the volume "Medicine" for 1904, which contains an exhaustive résumé of the huge volume of literature published during the previous year. A useful feature introduced in this issue is the general summary of the more noteworthy advances and discoveries made in each department of medicine during the year, which furnishes the reader with an idea of the special trend of medical investigation during the period under review. A full index facilitates the use of the book for purposes of rapid reference.

International Clinics, edited by A. O. J. Kelly, M.D. Vol. I. Fourteenth Series. 1904. (London: J. B. Lippincott Company, 1904.) The present volume of these *Clinics* scarcely maintains the claim of this work to the title "International," as nineteen of the twenty-three contributors hail from America and the remaining four from France. The first 180 pages are devoted to a series of original papers arranged under the headings, "Treatment," "Medicine," "Surgery," Gynæcology," and "Neurology." The majority of these are chiefly of clinical interest, and furnish refreshing résumés of the various subjects dealt with. Of the more scientific papers may be mentioned that by Dr. Henry W. Cattell on "The Practical Application of Cryoscopy to Medicine," which is one of the most complete summaries of this subject we have met with in English. Dr. Charles P. Noble makes some interesting observations on the work done in various German clinics which he visited during last summer.

The second half of the volume is given up to a résumé of the progress of medicine during the year 1903. It is of the "Year-Book" character, and is much too sketchy to be of any real value.

RECENT ADVANCES IN MEDICAL SCIENCE.

MEDICINE.

UNDER THE CHARGE OF

A. LOCKHART GILLESPIE, M.D., F.R.C.P.Ed.,
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DISEASES OF THE CIRCULATION—ARTERIO-SCLEROSIS.

THE *early diagnosis* of this condition, which, perhaps on account of the stress of modern life, seems to have become more common during the past fifty years, is discussed by Stengel (*Am. Med.*, Phila., 1904, Jan. 2). He believes that infectious diseases—*e.g.* typhoid—cause changes in the arterial system, which subsequently, under the operation of other agencies, become prominent. Among the more definite causes of arterio-sclerosis are, laborious work, alcohol, chronic metallic (especially lead) poisoning, syphilis, and, in particular, over-eating. While normal senile arterio-sclerosis is a general and uniform process, showing itself in a gradual failure of the organic functions, premature pathological arterio-sclerosis tends to affect one organ disproportionately, hence in its clinical manifestations cardiac, renal, or cerebral symptoms may predominate. This is the stage at which the disease is usually recognised, but its early detection is as important as the early diagnosis of phthisis. The first symptom is increased blood pressure, showing itself, in addition to the ordinary evidence afforded by the pulse, by lengthening of the first sound at the apex, accentuation of the second sound, marked tidal wave in the sphygmogram, and high arterial pressure as shown by the sphygmometer. These early symptoms alone are not, however, peculiar to arterio-sclerosis, and the symptoms on account of which patients seek advice are therefore doubly interesting to the clinician. Among the commonest are diminished vigour, pallor, and trivial signs of reduced vitality. These are especially marked when the myocardium suffers early, and are liable to be precipitated by shock or worry. Such cases are commonly mistaken for neurasthenia. Another early symptom is an alteration in the activity of the sweat glands—usually undue dryness of the skin, but sometimes abnormal perspiration. Of analogous nature are the urinary changes; the renal equilibrium is disturbed, reduced excretion and polyuria alternate, and the specific gravity varies constantly. Albuminuria is significant of comparatively advanced arterial disease; cylindroids appear long before casts can be found. When the heart is affected, early arythmia, forcible impulse, and slight dyspnœa are the chief symptoms; there is too great a tendency to ascribe such, in persons over forty, to the abuse of tea, alcohol, and tobacco. Finally, an early diagnosis can sometimes be made by discovering thickening of the retinal arteries with the ophthalmoscope.

The *etiology and pathology of arterio-sclerosis* is the subject of a paper (*Am. Med.*, Phila., 1904, March 12) by Anderson, who accepts Thoma's theory of the pathology of the condition—weakening of the media, dilatation of the vessels, slowing of the blood stream, and compensatory sclerosis of the intima. From a practical standpoint it follows from this view that, being compensatory, the sclerosis cannot, and ought not, to be lessened by treatment. Continuous high tension, increased by exertion, explains the frequent involvement of the aorta and vessels of the limbs in manual labourers, and of the cerebral arteries in brainworkers, etc. The kidney vessels are especially liable to involvement, because they convey toxic substances to be excreted, and the splenic vessels, on account of the variations in pressure during digestion. It has been observed in Russian peasants, that continuous labour in summer with comparative rest in winter is not associated with arterio-sclerosis, while in foundry hands, whose work goes on throughout the year, arterio-sclerosis is common. The following condition of the urine, not uncommonly found in insurance work among otherwise healthy business men of the better classes, is a danger signal—Hyperacidity, high specific gravity, faint traces of albumin, and a few hyaline casts or cylindroids, deposits of uric acid or oxalates, excess of indican, and decreased phosphates. High blood pressure occurs either as a cause, or, in other cases, a consequence of arterio-sclerosis. Causes other than high pressure may produce weakening of the media, and in these cases the pressure does not rise till the compensatory sclerosis takes place. Early diagnosis is all-important, hence the significance of the urinary symptoms mentioned. The rest of the paper is pathological, the endless variety of clinical phenomena possible, according to the organs chiefly affected, being insisted upon.

Early treatment and diagnosis of arterio-sclerosis (Erlenmeyer, *Deutsche Med.-Ztg.*, Berlin, 1904, Feb. 1 and 4).—(1) Give sodium and potassium iodide in equal parts, not the latter alone. (2) To prevent iodism, give the drug gradually, well diluted, after meals, beginning with 8 grs. and going up to 80 grs. daily. The dose is increased by 8 grs. every fourth day, so that by the thirty-sixth day the patient is getting the full quantity. (3) A further precaution against iodism is to give a drachm of bicarbonate of soda with each dose of iodide, and to forbid the use of acid food, such as fruits and wine. (4) The cure should be unremittingly pursued till from 300 to 500 grms. of iodide have been taken, and a shorter prophylactic cure should be repeated yearly or oftener thereafter. *Differential diagnosis*.—In the first stage of cerebral arterio-sclerosis the symptoms are those of neurasthenia—headache, giddiness, diminished attention and lessened capacity for work. In the second stage there are focal symptoms—

hemiplegia, aphasia, etc. Doubt only arises in the first stage, when the distinction from neurasthenia may be very difficult. Erlenmeyer relies on—(1) A family history of vascular disease; (2) in arterio-sclerosis any temporary exertion, such as straining at stool, climbing stairs, etc., which raises the intra-arterial pressure, intensifies the cerebral symptoms, the reverse of what takes place in neurasthenia. Next in value to the iodide cure, Erlenmeyer places Nauheim baths, only, however, when the blood pressure is not very high.

The diagnosis of arterio-sclerosis and angina pectoris (Sihle, *Wien. klin. Wchnschr.*, 1904, April 7).—After an account of the fallacies incidental to the various instrumental methods of estimating arterial pressure, the writer states that—(1) Stress cannot be laid on an absolute rise of pressure; we cannot say (as v. Basch asserts) that anything over 150 mm. Hg. is necessarily pathological. (2) It is useless to estimate the pressure in one artery alone. He points out that it is essential to estimate the pressure over a large circulatory area, and for this recommends a comparison between the brachial and digital arteries. From observations on persons with obvious arterio-sclerosis, he finds that the difference between these two averages from 60 to 120 mm., instead of the normal 25 to 50 mm. In the absence of any of the other signs of arterio-sclerosis, this may be relied on as an evidence that the disease exists. Continued great difference in pressure can only occur when the arterial tube offers great resistance to the blood-flow through it. In twenty-one cases of angina pectoris in which similar observations were made, abnormally great difference between the brachial and digital blood pressure was noted in fourteen; in the remainder the difference was less than normal, and the absolute pressure was also low. The first set were therefore cases of arterio-sclerosis; in the second the absolute low pressure excluded that condition. The writer was able to examine one case during an attack, and his results are of sufficient interest to quote in full:—First estimation—brachial pressure, 260; digital, 140; pulse, 54. In a few minutes cold sweat and nausea—brachial pressure, 130; digital, 50 to 60; pulse, 38. In another minute or two renewed pain—brachial pressure, 220; digital, 120; pulse, 54. After the attack passed off—brachial pressure, 140; digital, 80; pulse, 60. The principal conclusions are:—Arterio-sclerosis is preceded by a period of high arterial tension, which can be detected by combined measurement of the brachial and digital blood pressure. The more advanced the arterio-sclerosis the greater the difference between these two, provided that the heart is not enfeebled. The average normal difference in the brachial and digital pressures is 30 to 40 mm. Hg. A constant difference of over 60 indicates arterio-sclerosis. Arterio-sclerosis in the arm points with certainty to sclerosis in the internal organs; a normal or subnormal pressure (or difference in pressure) only points with great probability to absence of sclerosis elsewhere. Angina pectoris is a reflex neurosis, to which persons with arterio-sclerosis are specially liable; the pain is due to vascular spasm.

Bulbar lesions in arterio-sclerosis (Pic and Bonnamour, *Rév. de méd.*, Paris, 1904, Jan.).—While much study has been expended on cerebral arterio-sclerosis, and to a less extent on the relation of the disease to cord affections, the bulbar lesions in arterial disease have been-neglected. The clinical features of the condition—insidiously progressing spastic palsy without sensory symptoms—of which eleven cases are detailed in the paper, are these:—The patient complains of clumsiness and weakness of the legs and liability to fall. He walks with short steps, the toes catching the ground. Along with this there is exaggeration of the deep reflexes and ankle clonus. Babinski's sign is inconstant. There are usually symptoms of mental decay, and the usual signs of arterio-sclerosis. In the autopsies of their cases the writers found, among other lesions, a sclerosis of the medulla, chiefly affecting the pyramids.

Cardiac Displacement.

This is the topic of an interesting paper by Stone (*Boston Med. and Surg. Journ.*, 1904, Jan. 13). The subject naturally divides itself into congenital and acquired, or pathological, displacements. As to the first, Stone's main point is an answer in the negative to the question whether dextrocardia without transposition of the viscera occurs apart from other cardiac malformations. *Pathological displacements* are due to disturbances of the atmospheric equilibrium of the chest, to the traction of inflammatory adhesions, and to aneurysm or tumour. The third group of cases is not considered. An important point in connection with pathological displacement is that it may occur, both to a marked degree and comparatively suddenly, without any symptoms whatever. Stone gives several cases in which this took place from the release of a previously adherent lung after sudden and violent inspiration, as well as from unexplained causes in phthisis with cavities. While displacements due to adhesions are often erratic, the movements of the heart caused by air, etc., in the pleura, or by contraction of a large area of lung, are subject to definite laws dependent on anatomical and physiological conditions. The lower part of the pericardium is fixed to the diaphragm, and makes a firm flooring on which the heart is bedded. It is held in position above by ligaments attached to the third dorsal vertebra, the aponeurosis of the neck, and the sternum. Any weight, like an exudate, in the pleural cavity depresses the diaphragm and puts these ligaments on the stretch, so that the fluid does not press directly on the heart. In right-sided effusion the wall of the pericardium becomes a rigid partition protecting the auricles; in left-sided effusions the ventricular portion of the sac becomes tense and vertical, presses on the apex and moves it laterally, till, in an extreme case, it lies behind the xiphoid cartilage. When this point is reached the right portion of the pericardium is put on the stretch and opposes further movement. In left effusions, therefore, the displacement is not a twisting, but a thrusting of the heart *en masse* to the right, the apex being depressed and rotated forwards under the xiphoid cartilage. The right auricle and aorta move nearer the thoracic wall, and produce an impulse in the third, fourth, and fifth right spaces, which is often erroneously ascribed to the apex. Rotation is rare, and only caused by contracting adhesions. Sudden death from large effusions is not due to cardiac displacement or torsion of vessels.

ASPIRATION OF PERICARDIAL EFFUSIONS.

DOEBBERT's paper on this topic (*Berl. klin. Wchnschr.*, 1904, May 2) is chiefly made up of a detailed account of four cases. In two of these the needle was introduced in the fifth left space, near the sternum. Both were fatal, though in one, by three successive punctures, 130, 1050, and 200 c.cm. of fluid were withdrawn. In two other cases the tap was made in the fourth right space in the parasternal line; one recovered and one died of acute endocarditis. In no case did aspiration do any harm. The commentary on the cases is chiefly an argument in favour of right-sided puncture; and when difficulty is experienced in reaching fluid the writer advises that the patient's head and chest should be raised, because in the recumbent position fluid tends to gravitate to the back of the pericardium and the heart to float up to the chest wall.

SURGERY.

UNDER THE CHARGE OF

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CONGENITAL DISLOCATION OF THE HIP.

LORENZ contributes a paper (*Am. Med.*, Phila., 1904, June 18) on the treatment and after-treatment of congenital dislocations of the hip. He says that it makes little difference whether reduction is brought about by the lever manœuvres of abduction, or by extension, but all forms of reduction machines are to be avoided. The most important rule with regard to retention is the temporary fixation of the thigh in *right-angled abduction.* In this position the leg is fixed for from six to seven months on the average by a plaster to the knee, this joint being left free. On account of the fixation in this position for several months, there results an artificial abduction contracture, certain of the pelvi-trochanteric muscles undergoing shortening. As the degree of abduction is diminished, these shortened muscles become tense, and so retain the head of the bone in position, pressing the femoral head against the rudimentary acetabulum. During late years, after the removal of the plaster at the end of five, six, or seven months, Lorenz has *not* reapplied it. The restoration of the leg to its normal axis must take place very slowly, occupying a period of many months, even a year.

As regards the age limits for bloodless reduction, Lorenz believes that the age of 9 or 10 years should be the limit for reducible unilateral cases, and 7 to 8 years for the bilateral. In cases beyond the upper age limit some improvement may result from "inversion" of the joint, *i.e.* reversing the existing position of the joint into an opposite "habitual" position. The existing flexion-adduction is changed into an habitual abduction-hyperextension.

With reference to the lower age limit, the author does not approve of attempting correction until about the age when the child is beginning to walk. He prefers to begin treatment when the child is about three years old. By this time it is much easier to keep the child clean, and the muscles are sufficiently strong to take their share in the reparative process.

In conclusion, Lorenz issues a warning against too implicit reliance on the Röntgen picture alone in the diagnosis of this lesion and in estimating the results of treatment. Many fallacies exist in the interpretation of these radiograms, and he trusts more to a careful clinical examination of the patient. This is especially true as regards the condition of the rudimentary acetabulum. He usually finds that it is safe to conclude that if there is a good femoral neck there is also a good acetabulum, whatever the Röntgen rays may appear to indicate.

THE RESULTS OF EXCISION OF TUBERCULOUS KNEE JOINTS.

BLAUEL (*Beitr. z. klin. Chir.*, Tübingen, Bd. xlii. Heft 1) reviews a series of 400 cases of excision of the knee, carried out in von Bruns' clinic. Excision was never done in patients over 50, amputation taking its place. Extreme youth, on the other hand, was not regarded as a contra-indication to excision. Speaking generally, conservative treatment was adopted in early cases and in growing children, the treatment consisting of fixation of the limb after injection of iodoform. If no improvement followed in five to six months, excision was done. Arthrectomy was given up, as the results did not justify the attempts to obtain a movable joint. In excising the joint, the patella, the capsule, and all visible diseased tissues were freely removed, the bone sawn at right angles to the long axis of the limb, iodoform paste rubbed in, and the limb put up on a padded wooden splint. Pins were not used to keep the bones together. The trans-patellar incision was given up owing to recurrences in the patella, and the use of pins was given up because the results without them were as good as when they were used. After operation, fixation of the knee in plaster of Paris was kept up for at least nine months, and in the case of children for longer, if possible.

Of the 400 recorded cases, 215 were males, 185 females; and of 342 cases in which the record indicated the starting-point of the disease, the primary deposit was in the synovial membrane in 211 and in bone in 131. Further analysis showed that in patients under 15 years of age, 64·4 per cent. were synovial and 35·6 per cent. were bony in origin, while in those over 15, 57·1 per cent. were synovial and 42·9 per cent. bony. The ultimate result was ascertained in 385 cases, and Blauel estimates that in 87·9 per cent. of these cases the resection was successful in curing the disease, while in 12·1 per cent. it failed. Blauel also discusses the functional results, and it is interesting to note that in 72·3 per cent. of the cases examined the shortening was found to be less than 5 cms. Only 27 per cent. of' cases recovered with straight limbs, while the flexion was very marked in 44·9 per cent., illustrating what a marked tendency there is to flexion at the knee after excision of the joint. After reviewing the results as a whole, and comparing them with those of König for conservative treatment, Blauel concludes that the exceptionally good results of excision of the knee for tuberculosis justify us in regarding the radical operative treatment in adults and children as the normal procedure in all bad cases.

THE VALUE OF THE GLYCOGEN REACTION IN SURGICAL DIAGNOSIS.

KÜTTNER (*Arch. f. klin. Chir.*, Berlin, Bd. lxxiii. Heft 2) publishes a brief résumé of the results of observation of the glycogen reaction in the leucocytes in 470 surgical cases. He answers the important question, "Can the presence of a marked glycogen reaction in leucocytes be taken as a proof of the occurrence of acute suppuration?" with an emphatic negative. He finds that a positive reaction indicates merely the presence of an acute inflammatory condition, which may be already suppurative or about to resolve, or about to go on to pus formation. In appendicitis he finds that the reaction is always marked when peritoneal irritation is present, and that no observable difference is present between the reaction in cases with and without pus formation. Even in cases of superficial inflammations the diagnostic indications of the reaction are not positive, for it is as marked in cases of resolving infiltrations and glandular swelling as in suppurative cellulitis and glandular abscesses. In pure tuberculous affections the reaction is not present, and its absence may be of value, as indicating the absence of mixed infection. Küttner is inclined to attribute a prognostic value to continued observation of the reaction, for its intensity diminishes markedly as suppuration subsides; while, on the other hand, a continued marked reaction indicates that no improvement is taking place. He is of opinion that, although the theoretical interest of the reaction is considerable, its value to the practical surgeon as a diagnostic agent is slight.

THE USE OF RUBBER TISSUE AND BORACIC ACID IN THE TREATMENT OF SURFACE GRANULATING WOUNDS, AND ESPECIALLY OF THE VARICOSE ULCERS OF THE LEG.

SCHLEY (*Med. Rec.*, N. Y., 1904, June 4) has had exceptionally good results in treating ulcers by the following method:—Boracic acid is abundantly sprinkled upon the granulating surface. This is covered smoothly with rubber tissue, overlapping the edges of the ulcer by an inch or two, and held in place by adhesive plaster-strapping. Absorbent gauze covers the tissue, again overlapping its edges, and a supporting bandage completes the dressing. The dressing is left undisturbed for five to seven days. Schley recommends the combination of boracic acid and rubber tissue for the rapid epidermisation of the broader exuberantly or freely granulating surfaces. He points out that the dressing is not a dry one, the rubber tissue preventing evaporation, and that the total wound discharge with the boracic acid is less, but occasionally appears greater, because, being somewhat confined, it does not, as with the use of gauze, soak the dressings and become diffused. The antiseptic, astringent, and sweetening action of boracic acid permits of the advantage of infrequent dressings, bacterial growth being inhibited. Upon flat, firm, granulating surfaces this method appears to work well, but not so quickly as with the softer granulating surfaces; but upon either it appears faster than any method other than skin-grafting. Schley has not employed it as yet upon those ulcers with gangrenous or sloughy bases, or extensively upon those larger indolent ulcers without or with scanty granulating surfaces. Upon some smaller ulcers of this class it has worked well.

IODINE CATGUT.

FUCHS (*München. med. Wchnschr.*, No. 29, 1904) records his experience of the use of iodine catgut in the Kiel gynecological clinic and in private practice. The method of preparation was the same as that referred to in an abstract of a paper by Moschowitz in the August number of this Journal, namely, placing the raw catgut in a solution of iodine, iodide of potash and water, for eight days, after which it is ready for use. Fuchs used the catgut in a series of operations, including laparotomies and a variety of other gynecological operations, and was entirely satisfied with the results. All the cases ran an aseptic course, without any signs of irritation in the deeper layers of the wounds. The catgut was also used in some cases to unite the skin edges, but did not prove suitable for that, as the free iodine appeared to cause some slight irritation of the skin. As the result of his experience, Fuchs concludes—(1) Iodine catgut is easier to prepare than any other. (2) It is a convenient germ-free preparation, and its antiseptic properties are of decided use. (3) The iodine does not irritate the deeper layers of wounds, and the catgut is neither too resistant nor is it too easily absorbed. (4) On account of its strength, it is specially suitable as a ligature material. (5) It is not suitable for suturing the skin.

OBSTETRICS AND GYNÆCOLOGY.

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THE USE OF BOSSI'S DILATOR.

HAHL (*Arch. f. Gynaek.*, Berlin, 1904, Bd. lxxi. No. 3) reports uniformly favourable results in eleven cases, six of which were cases of eclampsia, the instrument being used three times before, and during labour. Hahl thinks that the instrument has very little effect on the strength and frequency of uterine contractions. Its use is contraindicated in placenta prævia on account of the soft condition of the cervix, and Hahl considers the following conditions most suitable for its employment:—1. Eclampsia; 2. accidental hæmorrhage; 3. abortion after the fourth month; 4. induction of premature labour, ordinary methods failing. After dilatation, delivery is best completed by application of forceps.

METRITIS DESICCANS.

GOTTSCHALK (*Ztschr. f. Geburtsh. u. Gynäk.*, Stuttgart, 1904, No. 23) reports the following case of this unusual condition:—P. 24, 1-para; pelvis contracted; was delivered by version after labour had lasted three days. Eighteen days later a fœtid portion of the uterine wall, measuring 16 x 4 x 2½ cm., was passed. The patient recovered and was again pregnant when the case was published. In this form of puerperal fever, infection and traumatism are the chief causes, although Gottschalk thinks that the use of strong antiseptics late in the course of such cases is specially injurious. Outstanding symptoms are—(1) Small rapid pulse, out of proportion to the temperature; (2) fœtid lochial discharge, appearing late in the course of the disease; (3) large size and tenderness of the uterus.

ACCIDENTAL PERFORATION OF THE UTERUS.

FAIRCHILD (*Ann. Gynæc. and Pædiat.*, vol. xvii., No. 5) thinks this accident far commoner than is generally supposed. Brothers collected sixty-six reported cases, seventeen of which died. When the uterus is softened by inflammation or disease (especially cancer), its wall may be so easily perforated that the operator may be unaware of the condition having occurred. Fairchild believes that the chief danger lies in giving intra-uterine injections, as infected material is thus easily carried into the peritoneal cavity through the perforation. In cases where no irrigation has been used, the best treatment is rest and ice applied to the lower part of the abdomen. If signs of severe infection appear, the uterus should be extirpated, and where the perforation is large, the fundus may be brought through an anterior vaginal incision, and the edges of the uterine wound sutured. Large uterine perforations must always be closed on account of the danger of prolapse of intestine with subsequent strangulation.

MERCURIAL POISONING BY INTRA-UTERINE DOUCHES.

BOISSART and Condert (*Bull. et mém. Soc. d'obst. et gynéc. de Paris*, 1903, No. 8) point out the danger of using toxic douches for the arrest of post-partum hæmorrhage. They report a case where the temperature rose on the ninth day, a douche was given of 1 : 8000 bichloride, followed by one of 2 litres of sterilised water. Hæmorrhage continuing, this was repeated on the following day, after the uterus was curetted. A few hours later there were dysenteric stools with tenesmus, vomiting and anuria, and later mercurial stomatitis; recovery. The authors point out that in women weakened by hæmorrhage such symptoms are most liable to occur, on account of the open condition of the uterine sinuses, and they recommend the injection of boiled water only.

PUERPERAL ECLAMPSIA TREATED BY RENAL DECAPSULATION.

EDEBOHLS (*Med. News*, N. Y., 1904, June) reports a second case where this treatment was successfully carried out. Renal decapsulation was performed on a patient at full term, suffering from convulsions with complete anuria. The fits ceased, and the flow of urine was re-established. Spontaneous delivery took place two days later. In the first case reported delivery had taken place before the fits commenced. Edebohls thinks this method of treatment will rival forced delivery in undelivered women, and will be a final resort when other measures fail to arrest convulsions beginning during the puerperium.

HÆMATURIA IN PREGNANCY.

KUBINGI (*Centralbl. f. Gynäk.*, Leipzig, 1904, No. 23) reports the case of a woman, 32, suffering from hæmaturia at the eighth month of pregnancy. A tumour the size of a cocoa-nut lay in front of the uterus. No blood could be drawn off by catheter. The urethra was dilated, and a large clot removed, when several pints of fœtid urine escaped. Cystoscopic examination showed the condition to be due to the rupture of a submucous varix. The hæmaturia commenced soon after the patient had lifted a heavy weight. A catheter was kept in the bladder for twenty-four hours, when the patient passed urine spontaneously, and there was no recurrence of the hæmorrhage.

THERAPEUTICS.

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MORPHIA IN CARDIAC CASES.

IN a paper in the *München. med. Wchnschr.*, 1904, No. 28, Grassmann attempts to formulate the indications for the use of morphia in cardiac conditions. He shows that for the normal healthy heart morphia has no depressing influence, when used in ordinary medicinal doses. There is, therefore, no reason to expect that its action in diseased conditions will be necessarily injurious. He acknowledges that in a limited number of cases sudden death occurs, apparently in connection with the use of morphia. The exact causal connection is not well understood, and he considers these unfortunate mishaps analogous to sudden deaths under chloroform. He has himself experienced two accidents of this kind. In the first case the patient was a woman, æt. 40, who suffered from symptoms indicating a mediastinal tumour. During a severe attack of dyspnœa and cyanosis an injection of morphia was given, and the patient died in five minutes. The other case was that of a student with mitral stenosis and aortic regurgitation. For absolute sleeplessness, combined with great restlessness and air hunger, an injection of morphia was given. This produced uneasy sleep, lasting two hours. The pupils remained very contracted, and in the following night the man died. On the other hand, Grassmann has treated with morphia, cases similar to these, for months, with apparent benefit. The unfortunate cases are possibly manifestations of a special idiosyncrasy. The symptoms which call for morphia are often subjective in character—palpitation, cardiac anxiety, pain, the various manifestations of dyspnœa, restless excitement and sleeplessness. Now, as long as these subjective symptoms are not associated with a manifest impairment of the cardiac efficiency, Grassmann thinks that morphia may be used with the same reservation, as regards establishment of habit, etc., as in other diseases. As a rule, in mere functional disturbance morphia is not required, but in the severer manifestations possibly too little use is made of it, *e.g.*, in pseudo-angina and severe paroxysmal tachycardia. As regards the use of morphia in acute febrile conditions, Grassmann would not use it in acute inflammation of the lung, or pleurisy or pericarditis, when the exudation is rapidly spreading. On the other hand, in the chronic form of tuberculosis and other diseases, the fear of deleterious effect on the heart need not prevent the use of morphia.

The existence of acute inflammatory changes in the valves or myocardium necessitates the greatest caution in the use of morphia. It is in the chronic affections of the heart and arteries that the beneficial effect of morphia is most evident. Almost all those afflicted with arterial or valvular changes reach a stage where digitalis fails to give relief, and narcotics are needed to produce sleep and freedom from pain. Persistent shortness of breath, especially if associated with orthopnœa, the violent pain of aortitis or chronic myocardial change, the terminal stages of dropsy, and the acuter manifestations of angina pectoris and stenocardia, may all be indications for the use of morphia. In many cases the relief obtained is not merely subjective, but seems in certain instances to be of a more lasting nature. The great advantage of morphia is the rapid relief obtained. Digitalis requires two or three days, morphia but a few minutes. Even great rapidity of the heart's action, with a weak pulse, in cardiac insufficiency or anginous conditions, does not negate the use of morphia. Whenever one cannot wait for the slow effect of digitalis, morphia should be used. Frequently dyspnœa is greatly relieved. Grassmann has repeatedly seen well-marked Cheyne-Stokes manifestations disappear under the continued use of small doses of morphia. Even when the patient has received morphia for long periods, there is not great difficulty in stopping the drug. In conditions of great restlessness the quieting influence of morphia benefits the heart, by removing the unnecessary work involved in the constant tossing and turning. It sometimes happens that digitalis produces no effect till morphia has soothed the general irritation. This use of morphia as a preparation for digitalis is an important one, and as very small doses only are required, it is without danger. It is not sufficiently known among doctors.

THE ACTION OF THE PRODUCTS OF ANTISEPTIC AUTOLYSIS OF THE SPLEEN.

LANDAU, when performing post-mortem examinations on cancer subjects, was struck with the almost complete freedom of the spleen from secondary infections. He raises the question, therefore, whether the spleen does not exert some influence antagonistic to the development of cancer. To test this point, he studied the effect of the expressed splenic juice, or of an extract made from the spleen on cancerous individuals, but was unable to find any beneficial action. In the course of his researches, he was greatly impressed with the richness of the splenic extract in organic iron. He states that it surpassed all known bodies in this respect. He tried the effect of the extract on certain cases of anæmia, when administered hypodermically. The general effect was satisfactory; while a further unexpected result was obtained in the case of a girl whose anæmia was due to profuse menorrhagia, which had resisted all treatment, both local and general. Within forty-eight hours of the first injection of the splenic extract the bleeding ceased. Since then Landau has been able to confirm this action in upwards of fifty-nine cases of metrorrhagia and menorrhagia. The extract, which was prepared from horses' spleens, seems to exert an almost specific effect in curing uterine capillary hæmorrhage. He has extracted a substance to which he gives the name of stagnin, to which this action is due. Hirsch describes the preparation of stagnin as follows:—The spleen is removed immediately after death, and kept on ice. Then, under antiseptic precautions, the pulp is removed and rubbed up with an equal volume of saline solution (0·9 per cent.), which has been made alkaline with soda. To prevent putrefactive changes, a little chloroform is added, and the mixture is allowed to stand for forty-eight hours, when it is filtered. It is then evaporated to one-fourth of its volume; and on adding alcohol a precipitate is obtained, which on drying forms stagnin.

The action of stagnin is rather obscure. It has no effect on the coagulation of blood when locally applied, nor does it act by constricting the blood vessels. It appears, however, to alter the coagulating properties of the blood when injected. While so far the new preparation has only been tried in gynæcological cases, it is suggested that it may be equally successful in the treatment of capillary hæmorrhage from other organs, *e.g.*, the lungs, stomach, and intestine.—*Berl. klin. Wchnschr.*, 1904, No. 22.

BIOSIN.

THIS is a new combination of iron, albumin, and lecithin. It is made from casein, yolk of egg, and an organic iron compound. In appearance it is a fine powder of a pleasant taste, and without any odour. It dissolves readily in water. Heim (*Berl. klin. Wchnschr.*, 1904, No. 22) has tested the preparation in upwards of a hundred cases with satisfactory results. He finds that the best method of administration is to give 20 to 30 grms., dissolved in water, at each meal. The solution may be sweetened to suit the taste. Biosin is well borne by the stomach, the appetite is sharpened, and digestion is not upset. The body weight rapidly increases; while in anæmic states the blood shows improvement, both as regards number of corpuscles and hæmoglobin. The preparation proved particularly suitable for nervous exhaustion and neurasthenia. Owing to the easy preparation, biosin is a cheap remedy, costing only 6 marks per kilo.

SALICYL-ARSENITE OF MERCURY.

COIGNET introduces a new mercurial salt. It is a compound of basic salicylate of mercury and methyl-arsenious acid. The resulting salt is white in colour and is soluble in water. The watery solution can be boiled without decomposing. Both the mercury and the arsenic are in a state of organic combination, and do not give the ordinary reactions. Although the drug contains 38 per cent. of mercury and 14 per cent. of arsenic, it shows but a very slight toxic action. For clinical purposes a solution is made containing 3 cgrms. to the c.c. of water. As a rule, 2 c.c. of this strength are injected into the muscles of the buttock daily. The injections are practically painless, and do not cause irritation or discomfort, so that the patient can go to work immediately after the injection. The elimination of the drug is rapid, and is especially marked about the second hour. Coignet has given upwards of 300 injections without having caused an unpleasant result. The curative action of the new compound does not differ from that of the benzoate, biniodide, or other salts. The drug has been tried in both primary and secondary syphilis. As a rule, about twenty to thirty injections are required to cure the primary lesion. The arsenic portion seems to have an excellent tonic influence on the blood and general nutrition.—*Lyon méd.*, 1904, No. 23.

LUMBAR PUNCTURE IN MENINGITIS.

IN tuberculous cases lumbar puncture has proved useless, but in a certain number of cases of serous meningitis in children it has been useful. Serous meningitis occurs chiefly in children in connection with acute febrile diseases, more especially pneumonia and erysipelas, and in adults with typhoid fever. The symptoms are those of ordinary meningitis, and, as a rule, the retina is congested and there is choked disc. Pathologically, such cases may only show enlargement of the ventricles. The cerebro-spinal fluid obtained by puncture remains sterile. Several cases of cure following spinal puncture have been recorded by Quincke and Lenhartz. Wertheimer (*München. med. Wchnschr.*, 1904, No. 23) reports a typical case in a boy, æt. 3, who developed meningitis after pneumonia. The boy became completely stuporose and was apparently dying when the first puncture was made, removing 15 c.c. of fluid. The puncture was repeated at first every third day, later every eighth day. In all, fourteen punctures were made, and the total amount of fluid obtained was 560 c.c. The amount obtained fluctuated considerably, the average amount lying between 30 c.c. and 80 c.c. The fluid was clear, and contained no bacteria. As a rule it flowed slowly, so that it took about one to one and a half hours to collect 20 c.c. In some cases the fluid gushed out, especially if the child was raised cautiously to a sitting position. By this means large amounts, 60 to 80 c.c., were obtained, and the cavity seemed to be completely drained. The general condition improved remarkably after such drainage, and this improvement lasted for six to eight days before stupor, grinding of the teeth, etc., indicated a further accumulation of fluid. The child recovered after three and a half months' treatment. The author thinks that in serous meningitis we should endeavour to drain the cerebrospinal sac by lumbar puncture, not only when puncture shows that the pressure is raised, but also when the general symptoms indicate pressure. By this means it may be possible to save certain cases of meningitis occurring in children in connection with acute febrile conditions.

PATHOLOGY AND BACTERIOLOGY.

UNDER THE CHARGE OF

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TRYPANOSOMATA AND SPIRILLA.

A REMARKABLE monograph by Schaudinn, on the change of generation and host in *Trypanosoma* and *Spirochæte*, appeared a few months ago in the *Arb. a. d. k. Gsndhtsamte.*, Berlin, 1904, Bd. xx. Heft 3. His results are based upon observations made upon the blood of a large number of the little stone owl (*Athene noctua*) which were partly caught in Rovigno, and partly obtained from bird-dealers. They corroborate and greatly extend the earlier work of Danilewsky, Sacharoff, and Ziemann, and are likely to have a most important bearing upon the life history of the trypanosomes of mammalia, especially of those occurring in diseases, *e.g.*, sleeping-sickness. Nothing is known of the life history of the trypanosomes of the blood of mammalia, except that they multiply by fission, but Schaudinn has shown that those inhabiting the blood of the owl undergo an extraordinary number of changes in form and mode of multiplication. Had many of these been accidentally observed, their genetic relationship might never have been even suspected. It may well be that similar changes occur in the trypanosomes of mammalian blood, and that some forms of Protozoa associated with disease in mammals, at present thought to be distinct and different because of their difference in shape, may really be different phases of the same organism. This has already been proved to be the case in malaria, and Schaudinn's researches show that it is also the case in some trypanosomes. One of the most remarkable of his results is to displace the *Spirillum Obermieri* (the cause of relapsing fever) from the position it has hitherto occupied as a bacterial disease, and to place it amongst the diseases caused by Protozoa. He has shown that the spirillum, or spirochæte, is a phase of a trypanosome, that it possesses at one stage of its existence the large nucleus and micronucleus characteristic of the trypanosomes, and, further, that it is capable of changing its shape and assuming forms very different from the familiar spiral thread. While still nucleated, it may contract and assume an oval or pear-shaped form. These oval nucleated bodies may be engulfed by leucocytes, and come still more to look like different or distinct parasites. Leishman was the first to make the suggestion that the parasites now known as the "Leishman-Donovan bodies," described by him, Donovan, and Christophers, in a peculiar Indian fever, are forms of a trypanosome. Rogers, lately (*Brit. Med. Journ.*, London, 1904, July 2), announced by telegram that "Trypanosoma developed in cultures of Leishman bodies," and, in the light of Schaudinn's results, Leishman states that the "resting forms" of *Trypanosoma noctuæ* are probably in accordance with the theory that the "bodies" met with in the liver, spleen, and in the neighbourhood of intestinal ulcers of human beings are "resting forms" also of trypanosomes. This conclusion is strengthened by the appearances assumed by the trypanosome in the tissue of the rat, which he has succeeded in demonstrating most beautifully by a modified staining method which he has lately described in the *Journal of Hygiene.* It is interesting to note that the result of the discussion on the nature of the Leishman-Donovan bodies in the Tropical Section of the recent meeting of the British Medical Association at Oxford was to adopt Leishman's view. Similar bodies have recently been described in Delhi sore, and it is reasonable to suggest that they may be of the same nature. These facts are sufficient to demonstrate the truth of the contention, that Schaudinn's results are likely to have far-reaching effects. They are highly technical, and very difficult to simplify, but they ought to be widely known. He found two trypanosomes in the blood of *Athene noctua*, namely, halteridium and the leucocytozoon, or leucocytozoa, discovered by Danilewsky, and described minutely by Ziemann. Proteosoma was also found, and its development in the common gnat (*Culex pipiens*) found to take place in the same way as in the sparrow. He speaks only of the first two in this communication. He showed that the halteridium is the sexual stage of a trypanosoma, which multiplies in the *Culex pipiens*, and, after a complicated migration through the body of the mosquito, is again introduced by its bite into the blood of the owl, where it undergoes a sexual multiplication, and is transformed into the male and female halteridium. The so-called leucocytozoon of the owl has recently been recognised by Laveran as a real hæmamœba. He has given it the specific name of *Hæmamœba ziemanni.* Fertilisation takes place, as in halteridium, in the intestine of the mosquito, the resulting giant ookinet becomes rounded off, and produces by a sexual process an enormous number of trypanosoma like buds, which become transformed into spirochætæ, or spirilla. These are not bacteria, but flagellated bodies, which, after wandering into the Malpighian tubes, multiply by longitudinal fission. After they fill these tubes, they pass to the anterior part of the œsophagus, and thence by the bite to the blood of the owl. After an asexual period of multiplication in the blood, in the form of spirilla, the large gametes are produced. In addition to this direct path through the body of the mosquito, both forms—the spirochætæ as well as the halteridium—may, under certain conditions, reach the ovaries of the mosquito, and there induce an affection of the next generation of mosquitoes. He traces the developmental cycle with the greatest care. He shows how the male and female stages of halteridium in the blood of the owl correspond to those observed by MacCallum in the blood of the crow and other birds. The pale microgametocytes, which are distinguished by coarse pigment, produce the microgametes, one of which penetrates into one of the darker macrogametes, distinguished by finer pigment. The macrogamete then becomes the ookinet. The ookinets are sexually differentiated even from their commencement. They develop in three ways, as neutral or hermaphrodite forms, or as male or female forms. The hermaphrodite forms may, under certain conditions, become males or females. The three series of forms may multiply asexually, the neutrals by dividing into two. All the females can again reproduce the three series of forms through parthenogenesis, but the males have only limited powers of development. They increase in a multiple manner, and are then capable of fecundation, and if they do not copulate with females they perish. Under certain conditions, there seems also to be a limit to propagation in the neutral and female forms both in the mosquito and in the bird. Causes resident in the parasites themselves, as well as environment (host), may all tend to limit the multiplication of the parasites. There may be large ookinets with a small nucleus, and small ookinets with a large nucleus. The plasma may be more or less copiously laden with reserve materials. There are males and females more or less well nourished; according to their origin, one may be old, the other young; they may have originated, some asexually by simple fission, others by means of parthenogenesis; in short, the author is convinced that the cause of the variability of the germinal cells, and therewith the differentiation of the sexes in these seemingly simple organisms, are represented by a combination of factors as numerous and complicated as is the case in the highest organisms. He describes carefully, and in some detail (which will be largely increased in the subsequent treatise still to appear), the origin of the neutral trypanosomes from the ookinet, their multiplication in the midgut of the mosquito, the development of the ookinets into the female trypanosoma, the origin of the male trypanosoma from the ookinets, and then the different and varying appearances which each of these present within the blood of the owl. To sum up, the blood of the owl contains the female trypanosome (macrogamete), and the male or sperm mother cell (microgametocyte), comparable to the crescent phase of the malarial parasite. The mosquito (*Culex pipiens*) draws by its bite some of the owl's blood into its stomach. The male cell is then seen to produce a number of microgametes, or spermatozoa, in the form of elongated animalcules, which become free, and seek out the female trypanosome, which meanwhile, by casting off its outer coat, etc., becomes rounded. One of them enters it, and fertilises it, after which it becomes elongated and active again. This is exactly like the exflagellation of the crescents and the fertilisation of the malarial parasite, with the resulting formation of the travelling vermicule or ookinet. This ookinet, in the case of the trypanosome, is seen to possess a nucleus, and within it the micro-nucleus (blepharoplast). It is an active body, and undergoes further elongation, and at the same time coils itself up into a solid amœba-like mass. The nucleus is meanwhile multiplying, so that the mass contains a large number of nuclei. The solid mass then breaks up into a number of small trypanosome-like bodies, the neutral or hermaphrodite forms, which are neither male nor female. It will be remembered that in the case of malaria the travelling vermicule becomes stationary in the outer wall of the mosquito's stomach, and after enlarging its contents becomes divided up into a number of cysts, which give origin to slender, worm-shaped bodies or spores, which migrate to the salivary glands of the mosquito, and are injected with the venom into the blood of man when the mosquito bites him. They subsequently enter the red blood cells, and carry on the well-known malarial life cycle. In the present instance, the young neutral trypanosomes, produced as above-mentioned, enter the Malpighian tubes, and after multiplication pass to the œsophagus, and thence by the bite to the blood of the owl, where they enter the red cells, and, becoming stationary, there grow to about double their original size. After about forty-eight hours' residence within a red cell, the young trypanosome now leaves the red cell as a gregarine-like body, which develops a flagellate apparatus. The migration of the parasite from the red blood cell usually takes place in the night, and is more plentifully seen in the interior organs than in the peripheral blood. After a period of motility in the trypanosome condition, the parasite again attaches itself to a red cell, and grows until the next night, when the same process is repeated. It is only after six days that it attains its full size. It now again migrates, and multiplies by quickly consecutive longitudinal divisions until the products of division have attained the lowest limit of size. The small ones again attack the red cells, and the process goes on until the blood swarms with them. These small forms are what have been called spirochætæ, and confused up till now with the bacterial parasites known as spirilla. The trypanosome may join another by one end, and fission may take place in both, extended in line, and before it is complete curious forms may be seen. Resting stages occur at all times, and still further complicate the picture. Thus a small spirochæta may contract and assume a resting stage not unlike a dumbbell, while in the process of fission two spirochætæ joined end to end may, while yet the resulting fourfold individual is imperfectly formed, contract into a resting stage like a small thick cross. Free individuals may come together and join end to end to form star-like agglomerations (agglutination), which falsely suggests a fission or budding process. The fission forms ultimately give rise to the full-sized sexual forms with which the cycle started. The resemblance between the life cycle of this trypanosome and the malarial parasite is therefore very close, and further highly interesting discoveries are likely to follow. Reference may be made, for instance, to one phase in the development of the trypanosome. Female forms in the gregarine condition may undergo a form of auto-fertilisation. The micro-nucleus approaches the nucleus, and after certain changes a new ookinet is produced, which now possesses the power of development. It produces exactly the same three sorts of trypanosomes as the ookinet created by copulation. This happens both in the intestine of the mosquito and in the blood of the owl, and results in a similar flooding thereof as in the first infection. This explains a relapse of trypanosome disease. These nuclear changes in parthenogenesis led him to test the malarial parasites of man for the discovery of the same process, and, though the difficulties are greater, he is convinced that in this case also the nuclear changes take place according to a scheme similar to that in the trypanosomes, and that there is likewise a a kind of auto-fertilisation. This may explain the relapses of malaria. He hopes to investigate this question in his further researches on malaria.

PHYSIOLOGY.

UNDER THE CHARGE OF

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INTESTINAL MOVEMENTS.

THE rhythmical pendular movements to be seen in the cat's intestine kept in a bath of normal saline at body temperature and with a free supply of oxygen, are not muscular but nervous in origin. In a series of interesting experiments, Magnus (*Arch. f. d. ges. Physiol.*, Bd. ciii. S. 515) has shown that so long as the nerve centres present in Auerbach's plexus are left in connection with the longitudinal muscular coat, the movements maintain their rhythmical character, but whenever these are removed this property of the intestinal wall is lost. In order to determine how the wave of excitation was transmitted, the effect of interruption of the various coats upon the character of the muscular contractions was studied. It was found that an interruption in Auerbach's or Meissner's plexus was not sufficient to check the transmission of the excitation wave, while section of the circular coat at once did so. The observations were made upon an isolated short portion of intestine, the lower surface of which had been fixed to a glass rod, while two pairs of serres-fines were inserted into the upper surface, one on either side, and a longitudinal slit made between them. These small clips were attached by threads to levers, and tracings were taken of the movements. The contractions of the two sides were seen to be synchronous and similar in character. If a very thin longitudinal slip of the outer muscular coat (with Auerbach's plexus attached) be taken from the lower surface, more or less in the same axis as the upper slit, the movements of the two sides retain their characters, remaining synchronous and similar in type. When the circular coat is cut along the same axis, the synchronous character of the tracings is lost. Each half still can initiate spontaneous movements, but they are no longer necessarily synchronous, although they may be so in some few cases. If the circular coat be not completely cut through, the small remaining uncut portion may serve to maintain a synchronous contraction of the two sides. The longitudinal coat, with its attached plexus, may be stripped completely from the one half, and even then the latter will beat synchronously with the other half, but it cannot initiate the movements, these being simply transmitted from the half which still has the plexus *in situ.* If the plexus-free half be artificially stimulated, it gives a greater contraction than the normal spontaneous one, and, at the same time, the other half of the intestine gives a similar contraction. If, however, the circular muscular coat still remaining intact between the two halves be now cut, artificial stimulation of the one no longer excites the other. Section or removal of the mucous and submucous coats does not interfere with the movements. From these experiments it is shown that Auerbach's plexus is not necessary for the transmission of the excitation wave, although required for its initiation. Also Meissner's plexus can play no part in the transmission. The wave of excitation, therefore, passes along the muscular coat, but whether along the muscle cells or along the fine nerve plexus between these cells, it is difficult to decide. On the whole, Magnus is inclined to believe that the latter is mainly implicated in the conduction, and he adduces the following reasons. It is known that nerve fibres *can* conduct the excitation wave, and the nerve centres are known in this case to discharge the initial excitation. Also, there is no case known where a wave of excitation is conducted along smooth unpoisoned muscles when there is not present a rich nerve supply. Also, as v. Uexküll has shown in some of the smooth musculature of *Sipunculus nudus*, no wave of excitation passes along, and in other cases where there is no smooth muscle, but only nerve fibres to bridge over a gap in a strip of musculation, the wave of excitation passes along the nerve fibres. A very important deduction to be drawn from the above experiments is that a nerve network may exist for transmission of excitatory processes, but not for their initiation.

In another communication (*ibid.*, p. 525) the same author describes some experiments which serve to further elucidate the nature of the rhythmical contractions, and especially their accompanying refractory period. In the case of other forms of rhythmical contraction (heart, ureter, respiratory movements in fish, etc.), the possession of a refractory period is a very characteristic property of each type. By many authors the refractory period of the cardiac contraction is supposed to be due to a property of the muscle. In other cases, however, the refractory period appears to be more directly connected with the nerve centres, as for example in the respiratory movements of fishes. In order to discover whether the refractory period (if there be one) of the pendular contractions is a property of the muscle or of the nerve centres, strips of the circular coat free from nerve plexus were taken. These, of course, were unable to contract spontaneously, but did so on the application of an artificial stimulus. At no period of the contraction was it possible to find a refractory period. Wherever the second stimulus was thrown in, it produced a contraction. In fact, the resultant contractions were summation phenomena, and if the stimuli were thrown in sufficiently rapidly, a true tetanus was produced.

Experiments were then made upon strips of musculature, longitudinal or longitudinal with circular coat, in which the nerve plexus was present. In all cases when nerve centres were present (Auerbach's plexus) it was found to be impossible to produce tetanus, the rhythmical contractions still persisting.

In such preparations, also, there is a refractory period during the contraction wave. If an artificial stimulus be applied during the phase of shortening or even at the beginning of relaxation, it produces no effect. Not until relaxation has passed its initial stage does the preparation respond to the second stimulus. This refractory period can be demonstrated both with electrical and mechanical stimulation.

A minimal stimulus does not, however, as a rule, produce a maximal effect. The refractory period lasts about five seconds, but becomes longer if the temperature be lowered, this increase simply accompanying the longer contraction wave.

PRODUCTION OF HÆMOLYSINS AND AGGLUTININS.

THE influence of the stromata and liquid of laked corpuscles on the production of hæmolysins and agglutinins has been investigated most carefully by G. N. Stewart (*Am. Journ. of Physiol.*, N. Y., 1904, vol. xi. p. 250). Very ingeniously taking advantage of the alterations in the conductivity of blood produced by the action of different laking agents, he has endeavoured to discover whether, in cases where electrolytes leave the corpuscles during laking, the power of producing specific agglutinins and lysins is a property of the stromata or of the laked fluid.

His experiments differ from others, such as those of Bordet, v. Dungern, and Nolf, in carefully studying the effect of different laking agents and not depending solely upon water-laked blood. Nolf, from a series of ingeniously contrived experiments, arrived at the conclusion that the stroma constituents only give rise to the production of agglutinin, while what he rather unfortunately terms the "cellular contents" furnish only the specific hæmolytic antibody (intermediary body of Ehrlich). It is impossible in this very brief abstract to describe Stewart's experimental methods, which will well repay careful study by bacteriologists.

The conclusions which he draws may be shortly summarised as follows:—

(1) Both the stromata and the hæmoglobin-containing liquid of coloured corpuscles laked by water, by freezing and thawing, and by heat, can cause the production of sera with specific hæmolytic and agglutinating power, when injected into an animal of a different species. (2) The injection of the stromata of corpuscles laked by milder agents (heat, freezing, and thawing, foreign serum, and minimal doses of saponin) causes the production of sera whose agglutinating power is more

marked than their hæmolytic power. (3) The injection of the liquid obtained by laking with the milder agents causes the production of sera whose hæmolytic power is more conspicuous than their agglutinating power, when compared with the sera produced after injection of the corresponding stromata. (4) The injection of the stromata of water-laked corpuscles causes the production both of specific agglutinin and hæmolysin, and the same is true of the liquid. But the serum produced under the influence of the stromata is weak in agglutinating power, and that produced under the influence of the liquid strong in agglutinating power, in comparison with the sera produced under the influence of the stromata and liquid respectively of corpuscles laked by the milder agents. (5) The injection of corpuscles fully fixed by formalin causes the production of serum with specific agglutinating and hæmolytic powers, but the agglutinating action is more marked than the hæmolytic. The injection of corpuscles partially fixed by formalin, but still capable of being slowly laked by water, causes the production of a serum with strong specific hæmolytic as well as strong agglutinating power. (6) The lysinogen, like the specific hæmolysin to which it gives rise, and, unlike the complement, is relatively thermostable, not being destroyed by the temperature of heat-laking (60° to 62°). The same is true of the agglutininogen.

DISEASES OF THE EYE.

UNDER THE CHARGE OF

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SEPTIC ULCER OF CORNEA CAUSED BY BACTERIUM COLI.

THE bacterium coli is so widely distributed, and plays so important a part apparently in pathological conditions of other portions of the body, that perhaps it is not surprising to find it causing a serious lesion of the eye. This is not the first time, in fact, in which it has been detected in this rôle, for though, as de Berardinis informs us, it has only once previously been demonstrated to be the cause of a septic ulcer of the cornea, it has been met with as the exciting factor in dacryocystitis, and in one or two cases of ophthalmia neonatorum. In the present instance the patient received a blow on the eye from the lash of a whip; this was followed by a hypopyon ulcer of the cornea, requiring enucleation of the globe eight days after the accident. The microscopic appearances were similar to those found in all cases of septic ulcer of the cornea, but an interesting point was that the bacilli were found most abundantly in those parts of the tissue which were least altered; they were most numerous in the deeper, non-infiltrated layers lying immediately in front of Descemet's membrane, which was perfectly entire and unbroken. The tests employed for identification seemed to point to certainty as to the precise organism, and inoculation tests led to the development of every similar condition in animals.—*Ann. di ottal.*, 1904, tome xxxiii.

HÆMORRHAGES IN THE EYE AT BIRTH.

IT has been known for a number of years that hæmorrhages in the retina occur in a somewhat large proportion of new-born children, quite apart from actual injury during birth from the use of instruments or from obvious "accidents." It is not unnatural to suppose that such might occur, when one reflects upon the compression of the child, and especially of the surface vessels of the child, during parturition. So soon, too, as the head is born, the compression of the body will assuredly drive a larger proportion of blood into the cranial vessels. Various observers, examining large numbers of infants, have placed the proportion in which intraocular hæmorrhages occur so high as 11, 25, and even 33 per cent. of births. If these figures are even approximately true, it is evident that absorption must be very complete, and the damage left be *nil*, in the vast majority of cases. It has, however, been suggested that possibly some at least of the cases of congenital amblyopia may take their origin from the occurrence of such a hæmorrhage which has damaged some "vital" part. There are obvious objections to this theory, but it cannot well be disproved. Most of the previous writers on this subject have found the favourite site of the hæmorrhages to be the posterior portion of the retina, but Coburn (New York), writing recently, considers them to be more frequent in the equatorial region; his observations are based on the microscopic examination of the eyes of thirty-seven infants who died in a Maternity Hospital, and in seventeen of whom he found retinal hæmorrhages. In most of the cases there could be no question as to simple diapedesis, for large areas of extravasation were found, which could only have occurred from the rupture of vessels of considerable size, and in more than four-fifths of the thirty-seven infants the whole retinal vessels were in a state of great dilatation. There seemed to be a tendency, as is only to be expected, for hæmorrhages to occur chiefly in the cases of prolonged or difficult labour, from whatever cause the difficulty arose; under these circumstances the use of forceps is apt to receive the blame of an occurrence which may just as well have been the result of the condition demanding artificial aid. A striking fact is that the hæmorrhages are practically all retinal; although the choroid is so much more vascular, choroidal hæmorrhages are very rare; Coburn suggests that possibly the compression of the head driving the cerebrospinal fluid into the nerve sheath, and interfering thus with the return along the retinal veins, may have some bearing on this fact.—*Arch. Ophth.*, N. Y., 1904, May.

The Causation of Cataract.

Could any one tell us the cause of the formation of the ordinary senile cataract, he would indeed confer a great boon upon humanity, for once we knew the cause we might have some hope of prevention. Theories, of course, there are in abundance, but not one which can be regarded as even approximately correct. The view urged by Pfister (Lucerne) is that the prime factor is a death, or at least a loss of vitality, of the epithelium of the lens. He considers that, owing to certain changes in the osmotic pressure of the fluids circulating round the lens, nutrition of that structure, always a difficult problem for nature to solve, becomes much hampered in presence of any pathological condition of the epithelium, and opacity is the result. These changes in osmotic pressure are apt to be largely due to changes in the secretion from the ciliary body, so that inflammation of this organ or of the iris becomes of great importance in this relation. He appears to believe that in a normal condition of the epithelium, the evil influence of such changes in osmotic pressure is largely negatived. The success of a method of hastening the ripening of cataract by rubbing over the lens, through the cornea, with a shell spatula, namely Förster's method, he explains by saying that under the massage the epithelium is disorganised, and osmosis between the lens substance and the surrounding fluids is lost.

He upholds the view that in diabetic cataract the degeneration of the lens is not due merely to the presence of sugar, though this must, of course, be a factor to be reckoned with, for the existence of another crystalloid body in the blood and aqueous must have some influence. In this he supports Deutschmann, who in one case in which no cataract was present found 0·5 per cent. of sugar in the aqueous tumour, and 8 per cent. constantly in the urine. In an eye after enucleation a 5 per cent. solution of sugar introduced into the anterior chamber caused the lens to become opaque in fourteen hours. It is manifest, however, that this line of reasoning must not be carried too far, for, while it takes a large amount of sugar in the aqueous to produce the change with rapidity, a very much smaller amount, acting twenty-four hours in every day, may reasonably enough have a very similar effect, given plenty of time. It is known that the presence of certain crystalloids in the aqueous humour may lead to grave injury to Descemet's membrane and to the epithelium of the lens. The chief practical conclusion in the paper is the somewhat unsatisfactory one that we are unable either to prevent cataract or to hinder its development when formation of opacity has begun: so that we stand just where we were. The author accepts to some extent the dictum of Schön, that errors of refraction, and in particular astigmatism, are apt to cause the development of cataract by rendering irregular and long-continued action of the ciliary muscle. This may be true, but there is no sufficient evidence of it.—*Cor.-Bl. f. schweiz. Aerzte*, Basel, 1904, January.

TREATMENT OF EPITHELIOMA WITH MIRMOL.

MIRMOL is a fluid of which the principal ingredient is formaldehyde. Since it was first brought out (by Ranelletti) in 1899, it has been used in a number of cases of inoperable cancer, chiefly by Italian surgeons, some of whom have a high opinion of its value. Maurizi gives an interesting account of a case of recurrent epithelioma in which he employed it. The cancerous ulcer, which was worst at the inner canthus, was treated with this in solution of 1 to 9 first of all. Later the concentration was made greater, and after cocain had been administered pieces of gauze were wetted in the solution and laid on. Very soon the surface of the ulcer began to "clean," and in not more than a few weeks the patient was able to leave hospital with the whole area healed up, and a very slight dimpling of the scar as the only sign that so grave a condition had ever been present. The pain was practically *nil* from the first application to the last.—*Boll. d. Osp. oftal.*, Rome, 1904, March.

ANALYTICAL REPORTS.

Petol.

(Petol Company, Cambridge; Edinburgh, 100 Princes Street.)

Petol is a comparatively new antiseptic substance which has already found favour with the general public. It is claimed for it by the manufacturers that it is non-poisonous, and this is a distinct advantage in view of the many cases of poisoning by other more popular antiseptics which are on record. Petol has a not unpleasant odour, and is put up in a variety of forms, both for domestic use and for therapeutic application. We can personally testify to its efficacy in allaying the pain and discomfort caused by sunburn and insect bites, and others are loud in their praises of its healing properties in various skin affections. In the opinion of "a celebrated skin specialist," "it has only to become well known to be universally used." Time will show if this be a correct estimate of its worth or not, and we will watch with interest the future of this new remedy.

Bayer Company Preparations.

(St. Dunstan's Hill, London, E.C.)

Citarin, mesotan, and helmitol are three preparations which have been recently placed on the market by the well-known Bayer Company. *Citarin* is anhydromethylene citrate of sodium, and its action depends upon the liberation of formaldehyde, which is set free in the blood, and unites with uric acid to form a compound which, as experiments have shown, is very soluble and easily eliminated. In addition, citarin increases the alkalinity of the blood, and consequently its capacity for holding uric acid in solution. For these reasons citarin is recommended for all attacks of acute gout; and experiments have shown that it is of great value in this disease. The dose is 30 grs., repeated four to six times a day, and it is important, in order to obtain the best results, to commence treatment as early as possible. So far no toxic effects have been recorded.

Mesotan is a substitute for oil of wintergreen, and is used for the local treatment of rheumatism. It is rapidly absorbed by the skin, and salicylic acid may be detected in the urine very soon after the mesotan has been painted on the skin. It is usually applied mixed with equal parts of olive oil, and it is not necessary to use any great friction in applying it. It is of no value in joint affections due to other than rheumatic causes,—in gonorrhœal synovitis for example.

Helmitol is claimed to be an improvement on urotropin. It liberates formaldehyde both in alkaline and in acid urine, and under its influence the urine becomes acid—an important point in ammoniacal fermentation. It may also be used in acute urinary disorders, since, owing to its analgesic action, any irritation is prevented. The average dose is 10 to 15 grs. two or three times a day, given preferably in water. It is well tolerated, and in moderate doses no irritation of the alimentary canal is produced.

These three preparations have already been tried and found of great value in Germany, and, coming as they do from a firm of such high standing, they are well worthy of a trial by the profession in this country.

TABLOID IRON, ARSENIC AND DIGITALIN; TABLOID BUTYL-CHLORAL HYDRATE AND GELSEMINE; TABLOID SPARTEINE SULPHATE; TABLOID HYDRARG. PERCHLOR.; TABLOID HYPODERMIC STRYCHNINE SULPHATE; SOLOID HEMISINE.

WE have received specimens from Messrs. Burroughs, Wellcome & Co. of a series of new tabloid preparations the names of which are given above. The first of these should prove a most useful addition to their already long list of tabloids, containing as it does 3 grs. of soluble phosphate of iron and $\frac{1}{100}$ gr. of both arsenious acid and digitalin. The soluble phosphate of iron used in this tabloid corresponds to a preparation recognised by the pharmacopœia of the United States of America, and possesses the advantages of solubility, and freedom from any tendency to cause constipation. The tabloid from its composition is both a blood tonic and cardiac stimulant. "Tabloid Butyl-Chloral Hydrate and Gelsemine" has been devised to provide a convenient means of combating the common and distressing pain of acute neuralgia of the fifth nerve. Each tabloid contains 3 grs. of butyl-chloral hydrate and $\frac{1}{200}$ gr. of gelsemine hydrochloride. Because of the very powerful action of the second ingredient, the instructions put upon the bottles containing these tabloids bear these words—"To be taken cautiously, and only by order of the physician." For some years hypodermic "Tabloids of Sparteine Sulphate" have been provided by the firm, with $\frac{1}{2}$ gr. in each, but to meet the requirements of physicians, who may wish to give the drug by the mouth, tabloids containing 1 gr. each have now been prepared. They are made with the special "Wellcome Brand of Sparteine Sulphate." As this drug sometimes succeeds where digitalis or strophanthus fails, this tabloid may well come in handy upon occasion.

The "Tabloid Hydrarg. Perchlor. et Potassii Iodidi" contains $\frac{1}{32}$ gr. of the first and $2\frac{1}{2}$ gr. of the second ingredient, it has been introduced to provide a trustworthy means of carrying out treatment by these drugs when small doses are required to be given with regularity for some time.

AN ALL-GLASS ASEPTIC HYPODERMIC SYRINGE.

BURROUGHS, WELLCOME & Co. have sent us one of their All-Glass Aseptic Hypodermic Syringes. In this syringe the barrel, piston, and nozzle consists entirely of glass, all ground as to their working surfaces to fit each other with accuracy. The hypodermic syringe is so devised that the solution used cannot come in contact with anything else than glass except for the needle itself, and can thus be readily sterilised, withdrawing the glass piston at one end as far as the limit mark in minims, thereby drawing up water through a nozzle, then removing the glass nozzle and dropping in a hypodermic disc into the syringe, refitting the nozzle, shaking until the disc is dissolved, and then putting on the steel needle, the syringe is ready for use. These syringes, we hope, will answer as well in practice as the good old common hypodermics, and better than many of the patent forms in the market, which work well for a day but are so apt to fail on the next.

EDINBURGH MEDICAL JOURNAL.

EDITORIAL.

The Leishman-Donovan Body.

THIS latest find in the field of tropical medicine was the subject of one of the most important discussions at the recent Oxford Meeting of the British Medical Association, and a perusal of the various contributions convinces one of its great importance. The amount of doubt as to the true nature of this new pathogenic agent is sufficiently indicated by its beautifully indefinite title of "body." Its true parasitic nature has been accepted by the highest authorities, however; and should some of the recent observations be confirmed, we should soon be able to give it its definite zoological position. It will be remembered that the parasite was first described by Leishman at Netley, in 1900, in the spleen (postmortem) of a soldier invalided from Dum-Dum with tropical cachexia and splenomegaly; and cases presenting a similar clinical picture were so frequently seen at Netley, from the same neighbourhood, that the condition was christened Dum-Dum fever. Leishman, in his original paper, was of the opinion that the organism was either a degeneration of, or represented some stage in the cycle of, a trypanosome or closely allied species, and though other views are still held, it seems probable that his original theory will prove correct. In 1903, Donovan independently described the parasite, and obtained it by splenic puncture during life, in a series of cases of tropical cachexia in the Madras district. Since then cases have been reported from three or four widely separated districts of India, from China, Tunis, Algiers, and Egypt—thus indicating a much wider geographical distribution of the disease than was at first anticipated. The symptoms of those cases of tropical cachexia seem fairly definite. Splenic enlargement seems constant, and hepatic enlargement common; there is a peculiar earthy pallor of skin, and in the advanced stages an intense degree of emaciation and muscular atrophy. There is fever, often continued for months, of no definite type, irregularly remittent. Hæmorrhages and transitory œdemas are common, and various complications—congestion of lungs, diarrhœa, dysentery, cancrum oris, etc.—frequently determine a fatal issue. The condition of the blood is worthy of note, there being marked total diminution in the number of the leucocytes, with proportional and often actual increase of the mononuclear forms. In addition, according to Leishman, there are negative signs of hardly less importance: malaria is absent, except as a concurrent affection yielding to ordinary treatment; the blood gives a negative typhoid reaction and negative Malta fever reaction; and, lastly, there is great resistance to all forms of medication, and specially quinine, in the later stages at least; this latter point, however, is not universally admitted. The symptomatology, it will be noticed, corresponds very closely with that of the peculiarly deadly fever of Assam and elsewhere in the Goalpara district, known as Kala-Azar (black fever). This mysterious malady, attracting attention first about 1887, has, according to Manson, seriously augmented the mortality and interfered with the material progress of the country. Previously attributed to some form of malaria, to ankylostomiasis, and later by Bentley to Malta fever, the etiology of the disease has long remained an anxious puzzle to the Indian authorities. It may be hoped, however, that the problem has now been solved; for the investigations of Bentley, Rogers, and others seem to point to its practical invariable association with the Leishman-Donovan parasite, and there seems to be a general acceptance of the view that Kala-Azar is to be regarded simply as an epidemic form of cachexial fever. Strangely enough, the parasite has been described in a widely different condition, namely, Delhi boil or Oriental sore, a local granuloma with a wide geographical distribution in the East. Similar bodies were many years ago described in this condition by Cunningham, and more recently Wright and Christopher have confirmed his observations. It would be strange should the parasite be found capable of producing such widely differing diseases.

Should Rogers' observations be confirmed, as has been said, the true nature of the parasite ought not to remain much longer in doubt. Ross came to the conclusion, from films sent to him by Donovan, that the bodies represented a new species belonging to the Sporozoa, and Laveran holds that they are a species of piroplasma, a red blood corpuscle parasite comparable with the *Pirosoma bigeminum* of Texas cattle fever. Rogers' experiments, however, though reading, as one speaker put it, rather like a fairy tale, seem so simple and conclusive that fallacy may fairly be excluded. Briefly, by adding the blood obtained by splenic puncture to sterile citrate of soda solution, to prevent coagulation, he has been able to demonstrate rapid multiplication of the parasites and the appearance of full-grown unmistakable trypanosomes, developing undoubtedly from the Leishman-Donovan bodies. Moreover, he has been able to demonstrate this, not only in a case of ordinary endemic cachexial fever from Lower Bengal, but also in the case of typical Kala-Azar from Assam.

This cultivation *in vitro* of a protozoal parasite of this nature is rather a new conception, and if confirmed it may be fairly hoped that further experimental observation will soon yield the final proof of its etiological relationship. Much remains to be done, of course: the organism has not yet been demonstrated in a natural condition apart from the body; the intermediate host is still to be sought, and the mode of entrance and exit of the parasite is still a matter of doubt. In this relation, however, the demonstration of the parasite in certain intestinal lesions, and its probable association with Delhi boil, may prove of importance. The similarity of those tropical cachexias with splenomegaly to the group of cases we know as splenic anæmia will no doubt stimulate research in the same direction. It is possible that some may be explained in a similar way. In connection with the clinical demonstration of the parasite by splenic puncture, Sir Patrick Manson has seen fit to express his opinion of the danger of its indiscriminate use. He seems to think that disastrous hæmorrhage may result in cases such as leucocythæmia, mistaken for cases of Kala-Azar, and insists on the absolute necessity of careful examination of the peripheral blood before splenic puncture is resorted to. As our knowledge of tropical diseases advances, one becomes increasingly impressed by the importance of the Protozoa as infective agents, and it need not be doubted that the explanation of many still obscure diseases will be found in the same direction. The advance during the past year of our knowledge in regard to the Leishman-Donovan body is indeed striking, and the various workers in this field may be indeed congratulated on their solid contribution to the subject; and the British School of Tropical Medicine will be generally admitted to have gained fresh laurels in the field of tropical disease.

Ben Nevis Observatory.

POOR old Scotland! not only has she had to suffer from the niggardliness of the Treasury in connection with her National Art Galleries, not only has she had to bow to the will of the highest court in the realm in connection with the Church Question, but now she finds herself deprived of the aid necessary to carry on a work which is without an example in the British Islands. The directors of the Ben Nevis Observatories noted in June 1902 that the funds received from the public for carrying on the same were exhausted, and that it would be necessary to close these observatories at the end of that year. Shortly afterwards, because a committee had been appointed by the First Lord of the Treasury to inquire into the question of the Parliamentary grant of £15,300 per annum for meteorology, the directors were pressed to try to keep the observatories in operation, seeing that they obtained each year £350 from the fund. As £350 was a ridiculously small sum on which to carry on the duties in the two observatories, private subscriptions had to be sought, and were obtained, providing means for the continuance of observations until October of this year. The fact that the observatory on the top of Ben Nevis in conjunction with the observatory at Fort William—the one close to sea level, the other 4404 ft. above it (the only instance in the British Isles of such close apposition of meteorological stations at such various heights)—has to be abandoned, because the Treasury will not supply a few extra hundred pounds, is absolutely disgraceful. It is even as disgraceful as the refusal of the Meteorological Office in London to make use of the returns from these observatories during the past years in the making up of their forecasts. It is no wonder that the forecasts issued for the north and west districts of Scotland have been so often fallacious!

There is no doubt that the Meteorological Society Reports are of considerable benefit both to seamen and agriculturists, but it seems that the predominant partner has to have the greatest say in the matter. "Bit sic things wull na dae!" For the sake of science and for the sake of Great Britain's scientific name, we hope earnestly that the Government will reconsider their decision, and advance each year the few hundreds extra which are required to support the most noteworthy meteorological stations under their sway—a thing they might well do, even if they have to expend a bawbee or twa upon the National Gallery pictures and the housing thereof.

It is important that the scientific work which is carried out for the good of the people, by men who gain very little from their self-sacrifice (except the consciousness that they are doing their best for others) should be recognised by the nation, and should not be simply dependent upon charity and a pitiful dole from the Government of this supposedly enlightened land.

The Regius Professor of Physic in Oxford.

THE venerable University of Oxford is to be warmly congratulated on the acceptance of the vacant chair by Professor Osler. The office has been held by a succession of distinguished men, who have adorned the position in many ways, each according to his own personal characteristics. It is certainly not in the least degree invidious to these brilliant lights of the medical firmament, to say that the new Professor will undoubtedly shed additional lustre upon the office to which he has been called. That the University has been able to induce Dr. Osler to leave the splendid position in Baltimore, which he has occupied with so much distinction, is a matter for rejoicing amongst all lovers of Oxford. During the last quarter of a century, much has been done to render the teaching of medical science a real and living part of the University, and in the new incumbent of the Chair those who have so successfully laboured for modern views and scientific methods will find a tower of strength.

But Professor Osler must also be congratulated on his appointment. It is assuredly a compliment, of which any one might well be proud, that the most ancient and renowned of all seats of learning within the British dominions should have invited him to fill a post hallowed by so many memories. In common, we believe, with every one in this country, we hasten to offer him our most cordial welcome to his new position, and we rejoice most heartily upon the powerful accession to the ranks of scientific workers which he will prove.

Neurology in Philadelphia.

THE Neurological Society of Philadelphia has recently celebrated the twentieth anniversary of its foundation, and on that occasion Dr. C. K. Mills, Professor of Neurology in the University of Pennsylvania, delivered a most interesting address on the growth of neurological work in Philadelphia. Professor Mills reviews the history of the teaching of nervous diseases in his own city, and mentions many of the more important contributions that have been made to Neurology by Philadelphian workers. We learn that the modern epoch began in 1871, when Dr. H. C. Wood was appointed Lecturer on Nervous Diseases in the University of Pennsylvania, the Lectureship being elevated two years later into a Chair. When Dr. Wood resigned in 1901, Dr. Mills succeeded him; two years afterwards, the title of the Chair was altered, so that he became Professor of Neurology. In 1903, Dr. Spiller was elected Professor of Neuropathology. In addition to these Chairs, there are—a Chair of Mental Diseases in the University of Pennsylvania, filled by Dr. Burr; a Chair of Nervous and Mental Diseases in the Jefferson Medical College, occupied by Dr. Dercum; a Chair of Nervous Diseases in the Medico-Chirurgical College, held by Dr. Pearce; and also a Chair in the Philadelphian Polyclinic, filled by Dr. Spiller, who also holds the Chair of Nervous Diseases in the Women's Medical College. Dr. Mills gives full references to the wonderfully complete arrangements, both as regards hospitals and laboratories, made for the teaching of the different branches of Neurology. It is impossible to read his address without admiration for the energy shown in these advances, and the success with which these advances have been followed; while, on considering the contributions made to neurological literature, it is clear that modern medicine owes a deep debt of gratitude to our brethren in Philadelphia.

International Catalogue of Scientific Literature.

THE first annual issue of this huge catalogue, published by the Royal Society of London for the International Council, is slowly approaching completion for the year 1901, and it fills one with amazement. As is well known, it is an outgrowth of the *Catalogue of Scientific Papers* relating to the scientific literature of the nineteenth century, published by the Royal Society of London, and it attempts to be a practical synthesis of all the many scientific *Jahresberichte* or *Records* which have been published in the interests of separate sciences. It has the outstanding merit of being international in management, and international in the reach of its net, for there are over thirty regional bureaus. Each complete annual issue will include seventeen volumes, dealing with respective sciences or subdivisions of sciences. Thus, there is a volume to Bacteriology and another to General Biology, a volume to Human Anatomy and another to Physical Anthropology, a volume to Geology and another to Mineralogy, and so on. The price of the annual set is £18, while individual volumes are procurable at prices varying from 10 to 40 shillings. In each volume there is—(*a*) A scheme of classification in four languages (which seems an unnecessarily luxurious convenience, occupying 152 pages in Part I. of the "Physiological Record"); (*b*) an authors' catalogue with full titles (translated, if not Latin, English, French, German, or Italian); (*c*) a subject index, most elaborately classified, so that one can find out at once if anybody has said anything in 1901 on any scientific subject, from Abdomen to Zymogen; and (*d*) a list of the full titles of the journals referred to. It is obvious that to any one who works at science this splendid addition to our bibliographical resources will prove of inestimable value, and that the whole set should be within access in every centre. Moreover, the separate volumes are readily procurable by individuals. We have tested some of the parts in the usual way, by looking for our own name first, and then for that of our friends, and the records seem to be almost miraculously accurate. The ideal has been pitched very high, and the only question is whether it can be kept up, and if falling into hopeless arrears can be avoided. It is now 1904, and the issue for 1901 is not completed. Unless this lateness can be overcome, we fear that many workers will still remain loyal to their own much-prized special *Records*, which usually appear within a year or two of the publication of the papers.

An Asylum Magazine.

AFTER an interval of several years, the *Sunnyside Chronicle* has again made its appearance. In his Annual Report to the Directors, Dr. Havelock mentioned that there was probably in the Royal Asylum, Montrose, a variety of literary talent that would find a safe outlet in the pages of a magazine. That he was correct in his supposition is amply proved by the three numbers of the *Chronicle* which have appeared in July, August, and September of this year. Poems, travels, sports, and stories, as well as local notes, make up a really interesting series of articles. Entirely coinciding in the views of Dr. Havelock, we welcome the revival of the *Chronicle* very sincerely, and hope it may have the successful future which its auspicious revival would seem to guarantee.

ORIGINAL COMMUNICATIONS.

CASE OF COMPLETE TRANSPOSITION OF THE VISCERA, WITH CEREBRAL TUMOUR AND OTHER PATHOLOGICAL CONDITIONS.[1]

By Sir THOMAS R. FRASER, M.D., F.R.C.P.Ed.

(PLATE IV.)

IN 1888 I communicated to this Society a description of a case of complete transposition or inversion of the thoracic and abdominal viscera, in which the transposition was discovered during the examination of a patient suffering from cardiac valvular disease (1). This patient, a married woman, 23 years of age, recovered from the illness produced by the cardiac disease, and remained well while under observation for several years; but, as she afterwards left this part of the country, her subsequent history is unknown.

A second case, that which I propose to describe to-night, recently came under observation; and it differs from the former in so far that a concurrent malady from which the patient suffered led to a fatal termination, and that an opportunity was thereby given for a more full and direct study of the transposition than could be made during the life of the patient.

CASE.—The subject of this communication was admitted into the Royal Infirmary in July 1902, in the first instance into Professor Annandale's wards, but as the illness did not admit of surgical treatment, he was transferred in a few days to my care. The primary cause of his admission seems to have been a long-standing pyuria, but he also complained of headache.

He was a well-nourished young man, 24 years of age, rather stunted in growth (8 st. 7¾ lb. in weight, and 4 ft. 11 in. in height), with a round bullet-shaped head and stolid expression. We were informed that his father had died, when 72 years old, of bronchitic influenza, and his mother of phthisis, at the age of 62. A brother and sister died in infancy, and three brothers and five sisters were alive and in good health. There was no history of nervous disease in the family, and the patient had never suffered from any venereal affection. He was unmarried, and, until a few years ago, had followed the occupation of ironmoulder, but latterly he had been employed in the warehouse of the works; and in both occupations he was required to lift heavy weights. During the last two months he had not done any work. The patient does not remember that he ever had any noteworthy illness or accident until the present symptoms began, but their duration has now extended over several years.

When he was 10 years old he began to experience uncomfortable and

[1] Read before the Medico-Chirurgical Society of Edinburgh on 6th July 1904, with Illustrations.

sometimes painful sensations at the lower antero-lateral portion of the right thorax, from which he did not become free until he was 19 years old.

For a considerable number of years his urine had been muddy, and the bladder had been several times washed out by the doctor who attended him.

The history of the earliest occurrence of headache was somewhat vague, but, from the information given by the patient and his relations, it appears that he had suffered slightly from headaches for seven or eight years. They, however, attracted little attention until about four years before he first came under observation. At this time, during a visit to Glasgow on business affairs, which much excited him, he got very wet, and on returning to his home at Falkirk a severe headache came on, which lasted for several hours. At the same time there was a recurrence of pain at the right thorax. Without any apparent cause, a second severe headache occurred a month afterwards, and since then they have reappeared at irregular intervals. The pains had always been felt in the suboccipital region, but could not be very sharply localised. They were attended with flushing of the face and a sensation of heat, and on a few occasions with vomiting. The administration of purgatives generally lessened their severity and duration. With varying intervals of respite, the headaches continued to recur for about three years, when they entirely disappeared for about six months. They then reappeared, at first in a slight form, but gradually with increasing severity, until they had regained their distressing characters, shortly before the patient entered the Infirmary.

Although the patient had first stated that he had not had any accident of importance,.he afterwards told us that about seven or eight years ago he had fallen from a swing and sustained some injury of the head, the effects of which, however, had lasted for only a short time. His recollections of this injury were very imperfect, nor could he give any information regarding a scar, about 2 in. in length, which was found over the postero-superior angle of the right parietal bone.

When the physical examination of the patient was made, the only other external abnormality that was found was a bifid condition of the right thumb, a supernumerary thumb springing from the metacarpo-phalangeal joint. The accessory digit was rather stunted, and was not separated from the true digit. There were six metacarpal bones present.

The physical examination, however, had not proceeded far before it was found that there was a transposition of the thoracic and abdominal viscera, and it was then discovered that the patient was himself aware of its existence. He told us that many years ago one of his brothers, who had served in the Army Medical Corps, had noticed that the patient's "heart was beating at the wrong side of the chest." Shortly afterwards, a doctor, who was attending his mother in an illness, was asked to examine him, and he confirmed the brother's opinion, and afterwards took the patient to Dr. Boyd of Glasgow, who made a careful examination, and published an interesting account of the case in the *Glasgow Medical Journal* of 1895 (2).

In regard to this transposition, the nature and completeness of it are shown in the tracing of the results of the physical examination (Fig. 1). In order to determine if the transposition involved the lowest portions

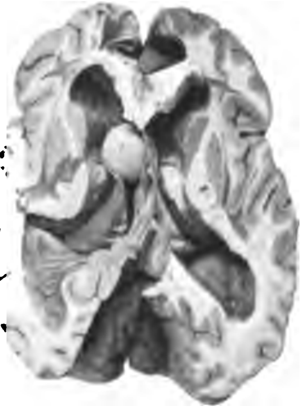

FIG. 3.

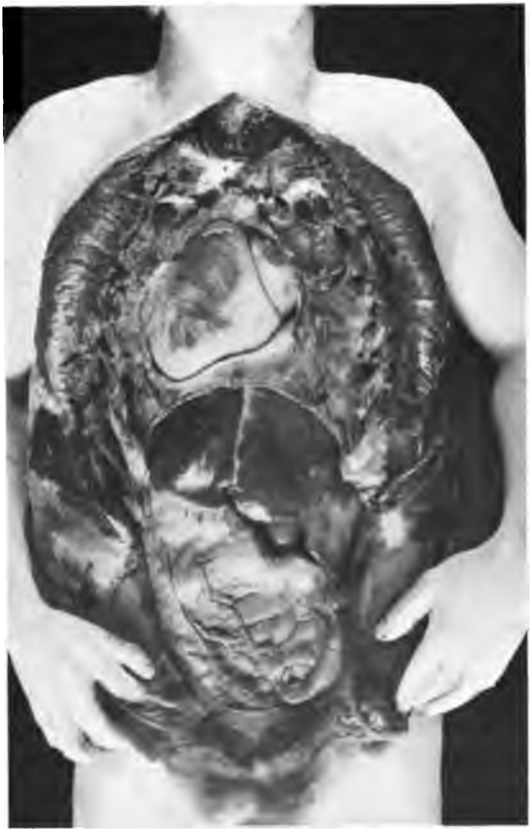

FIG. 2.

of the alimentary canal as well as the higher, on 3rd August 1902, two pints of warm water were injected into the rectum, after it had been ascertained that the percussion note was tympanitic in the iliac and lumbar regions of both sides. The result of the injection was to render these regions dull on percussion on the right flank, while, after the injected water had been discharged per ano, the tympanitic note returned to this flank. It was thus shown that the rectum, descending colon, and cæcum were transposed, along with all the other abdominal viscera whose position could be determined by physical examination. The further facts ascertained in the examination of the patient upon this occasion of his residence in the Royal Infirmary, which may be mentioned, were: that he was slightly dyspeptic, although his appetite was good and the bowel functions regularly performed; that the liver was somewhat enlarged, its length in the mammary line being 7 in.; that the pulse was one of moderate tension, 62 in the minute and generally regular; that a presystolic mitral murmur existed, with accentuated and reduplicated second sound; that the lungs were healthy, and the temperature normal; and that the urine contained a small quantity of pus, but no tube casts. The nervous system showed no abnormality, with the exception of the described painful paroxysms and some mental depression or apathy, and also with the exception of a congenital loss of the sense of smell. This anosmia was apparently a family or hereditary defect, as it also existed in the mother and a brother and two sisters.

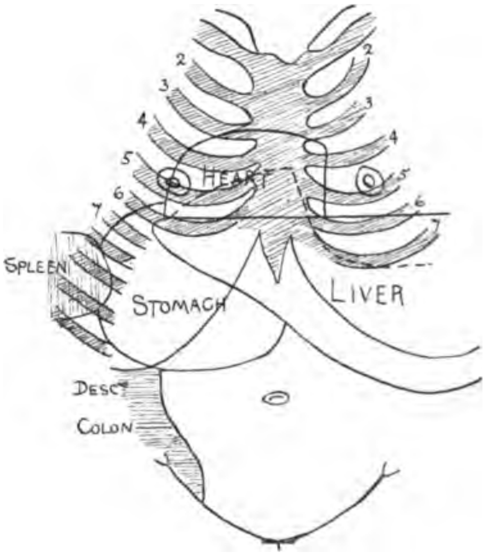

FIG. 1.

The diagnosis was arrived at, that the patient was suffering from pyelitis and also from brain pressure produced by some cause—probably a non-malignant tumour—situated towards the middle of the brain and in a position beyond the range of successful surgical treatment. There was, however, an element of doubt introduced into the diagnosis of brain tumour, for the patient was a confirmed masturbator, who had indulged in this vice for at least six years; and the mental condition as well as the occipital pains somewhat resembled those which are met with in such cases.

For the head pains, of which several paroxysms occurred after the patient had been admitted into the Infirmary, a blister was applied to the back of the head on the 27th of August 1902, and from that date until the 9th of September, when the patient left the hospital, no further pain was experienced. The pyelitis was treated with urotropine, salol, and benzoic acid, but the result was unsatisfactory.

After the patient had left the Infirmary, he remained in fairly good health for several months, but the pains in the head again appeared, and he now noticed that immediately before and during the painful attacks his vision became indistinct; and, soon afterwards, this indistinctness became greater and was present even when there was no headache. This return of the former symptoms in an exaggerated form, and the addition of others, led to his again being admitted into Ward 26, in January 1904.

With the above-noted exceptions, and with some further implications of the nervous system, the symptoms were essentially the same as when he was formerly in the hospital.

In regard to the nervous system, not only had the suboccipital pain become more severe and of more frequent occurrence, but for several months there had also been experienced sensations of formication and of numbness and tingling in the legs; and, on examination, there appeared to be a slight blunting of tactile sensibility over the left side, especially in the upper extremities. Vision was now much impaired, and with the left eye the ability to distinguish between light and darkness was nearly all that remained. Some lateral nystagmus existed, especially on rotation to the right side, and there was atrophy of both discs, moderate in the right but pronounced in the left. The superficial and deep reflexes, coordination and voluntary motion, were normal, and it may be noted that the patient was right-handed. He could write well and easily, except when excited, and could stand with the feet placed together and the eyes closed, with almost no swaying of the body. Speech was unchanged, but the intelligence was more blunted, and during the last two years the memory had become impaired. No tenderness was found when the cranium and spine were percussed. There was slight tremulousness of the hands and tongue.

The severity of the headaches, and the new symptoms apparently associated with them, caused more attention to be given to the characters of these painful paroxysms than when the patient had previously been under observation. He informed us that he always knew when the head pains would occur, as a few minutes previously he felt weak in the legs and mentally dull. The pain then began at the back of the head, dull and boring at first, but, in from five to ten minutes, agonising in its intensity, especially immediately below the occipital protuberance. In the painful attacks he could not stand or sit upright, but lay on his back moaning incessantly, with the head drawn backwards, and the arms and legs extended and thrown outwards. After about ten minutes, the pain became slowly mitigated in severity, and he usually then fell into a deep sleep, from which he wakened in a dull and confused state. Vomiting occurred when the headache was very severe.

During the first few days, however, of the second residence of the patient in the Infirmary, we had no opportunity of confirming this description of the head pain which was given to us by the patient and his relations. For ten days, there was merely a slight dull pain at the back of the head, and the patient went about the ward freely and took his food well; but on the evening of the tenth day a severe headache occurred. This was repeated on the following evening, when he rolled about in bed for about half an hour, groaning frequently. Phenacetin appeared to give some relief, but purgatives now failed to produce any benefit.

On the following (twelfth) day, three or four severe atacks of head pain occurred, over which no therapeutic influence appeared to be exerted by phenacetin, bromides, or purgatives, unless it were that he had entire freedom from pain on the following day.

On the fourteenth day, however, the pains returned. The second attack on that day was an extremely prolonged one, and during it the patient vomited. The pain continued all night. At 10 A.M. on the following (fifteenth) day, he was groaning loudly; at 10.40 A.M. the pulse became small and of high tension, but sodium nitrate produced no benefit. He vomited several times during the forenoon; there were no convulsions, nor had the breath a uræmic odour. At 1 P.M. the breathing stopped for a short time, the face became pale, and the patient lay motionless. Some laboured respirations afterwards occurred, during which the pulse was found to be weak and rapid (100 per minute); and death took place a few minutes afterwards, quietly and without any spasms or convulsions.

During both occasions on which the patient had been in the Royal Infirmary, the temperature had always remained normal or subnormal, with minimal and maximal extremes of 97° and 99° F. During the last two days of the patient's life, it ranged between 98·2° and 97°, and was at the latter point when death occurred.

The evidence obtained during life of a complete transposition of the viscera, and the remarkable characters of the brain symptoms, rendered it of importance and of high interest to obtain an examination of the body. The relatives were at first much opposed to an examination being made, and it was only after much trouble that their consent was obtained.

The post-mortem examination was made on the forenoon of the second day after death, by Dr. Stuart Macdonald. When the contents of the abdomen and thorax were exposed, confirmation was obtained of the diagnosis of complete transformation of the viscera. The exposed viscera were photographed *in situ* by Dr. Carnegie Dickson and Mr. Richard Muir (Plate IV. Fig. 2). The transposition of the heart, liver with its gall bladder, and large intestines, is clearly displayed. It will be observed that the liver is enlarged, and that the cæcum, which is on the left side, has the fœtal characteristics of conical shape and small size, and that these characteristics are also manifested in the unusual length and upright position of the appendix vermiformis. At this time, the viscera were not examined further than that an incision was made into the right kidney, with the result that some pus escaped, confirming the diagnosis of pyelitis. The brain, however, was exposed, and a bilateral hydrocephalus was found to exist, there being much clear fluid in both lateral ventricles. At the level of the lateral ventricles, also, a most interesting pathological condition was found to exist, which afforded a complete explanation of the head symptoms. A translucent rounded tumour, about the size of a large marble, nearly ¾ in. in its greatest transverse diameter, soft and fluctuating, and with a smooth and pale surface, occupied a nearly central position in the transverse section of the brain (see Plate IV. Fig. 3). It was situated between the anterior pillar of the left fornix and the tuberosity of the left optic thalamus, with the greater portion of it at the left of the median line, but encroaching also to the right of that line. This situation explains the distension and dilatation of the ventricles, for the tumour is placed immediately over the left foramen of Monro, and had produced congestion and had exerted pressure upon veins proceeding from the corpus striatum, and also upon a choroidal vein; and its encroachment upon the right side further impeded the venous circulation of the lateral and third ventricles. On further examination, the tumour was found to be pear-shaped, the broader extremity being the upper one shown in the illustration, while the narrow extremity was actually within the left foramen of Monro, and, by lateral extension, had further obstructed the right foramen. Professor Cunningham, who has examined the specimen, considers that the tumour has grown from the ependyma. Microscopic examination of stained and hardened sections confirmed the opinion of its being a cyst. They exhibit a nearly structureless, somewhat laminated texture, such as might be produced by an originally semi-solid fibro-serous or mucoid substance which had become coagulated, and at the periphery of the sections and occasionally in the body groups are seen of degenerated epithelial elements.

I have referred to the evidences of complete transposition in so far as they could be obtained by superficial examination. A more detailed examination of the deeper contents of the thoracic, abdominal, and pelvic cavities has been made under Professor Cunningham's supervision by Mr. A. G. K. Ledger, a senior student of anatomy. The note he prepared is as follows:—

"As far as the case has been examined, it is a complete case of transposition, extending to every detail.

"*Thoracic viscera.*—The right lung has two lobes, one superior divided from the inferior by an oblique fissure, just as is typical on the left side. The structures composing the root of the right lung have the relationship which is usual on the left side; that is, the pulmonary artery is superior, the vein inferior, and the bronchus intermediate and posterior. The left lung is trilobed; the fissures separating the lobes are typical. The structures in the root of the left lung are arranged as follows: most superiorly is a bronchus (eparterial); next the pulmonary artery, then a bronchus (hyparterial), and most inferiorly the pulmonary vein. The heart is also completely transposed. The apex points to the right and downwards; it is formed by the right ventricle, which also forms the right border (the *margo obtusus* in this case). The inferior border is formed by the left ventricle. The left auricular appendix is the one which is seen from the front when the parts are in position, the right being completely hidden.

"The aorta springs from the base of the heart behind, and slightly to the left of the pulmonary artery. The arch passes backwards and to the right; the aorta then runs down beside the vertebral column, gradually gaining the middle line behind the œsophagus as normally, except that it approaches the mesial plane from the right instead of from the left. The innominate artery is on the left side; it is the first branch of the aorta. The right common carotid artery arises in common with the innominate artery. The right subclavian artery has a separate origin from the aortic arch.

"The pulmonary artery is well seen passing directly backwards, as normally, from its origin to the concavity of the aortic arch.

"The thoracic duct is on the right side. The right innominate vein crosses to the left superficially to the great arteries arising from the aortic arch, and on the left side forms the superior vena cava by uniting with the left innominate vein. The vena azygos major is on the left side, and joins the vena cava superior just before this enters the left auricle. The vena cava inferior pierces the diaphragm to the left of the mesial plane, and enters the left auricle.

"The left vagus nerve passes down into the abdomen upon the posterior aspect of the œsophagus, while the right is anterior.

"*Abdominal viscera.*—The stomach is on the right side. It is enlarged, but occupies what is usually described as the typical region, except that it is on the opposite side. The pylorus is in the mesial plane.

"The liver is also enlarged; it is on the left side.

"The spleen is situated on the right side behind the fundus of the stomach. The condition of the organ is normal.

"The superior mesenteric vessels can be felt in the mesentery proper passing downwards and to the left.

"The cæcum is in the left iliac fossa. It is fœtal in condition, the appendix vermiformis arising from the apex of the cæcum, which is rather under the usual size, and very decidedly conical in shape. The sigmoid colon is on the right side, and also the pelvic colon and rectum."

The heterotaxy involves, therefore, not only the important organs displayed in the photograph, but also all the underlying organs and structures, such as the bronchi, blood vessels, and nerves in the thorax, and the pancreas, duodenum, blood vessels, and nerves in the abdomen.

A considerable number of cases of this remarkable heterotaxy have been described since the first case of transposition was recorded in 1652, by Riolan (3), but there have been only a small number in which the condition was both recognised during life and studied after death.

I have not had access to any more recent collection of cases than that published in *Virchow's Archiv* in 1884, by Dr. Richter of Dalldorf (4). This collection comprises forty cases, of which twenty-four were examined after death. Of the latter, seventeen exhibited complete heterotaxy, and it is interesting to observe, in connection both with my present case and the one which I described before this Society in 1888, that in only one of Richter's cases was the subject left-handed, and that cardiac lesions existed in six of the twenty-four that were examined after death. The sex was noted in thirty-five of the forty cases, and nineteen were of the male and sixteen of the female sex.

There have been many surmises as to the causes by which transposition of the viscera is produced, but it would serve no useful purpose to discuss them, as it is generally admitted that the teratological problem still remains unsolved.

The case I have to-night described has, however, another interest. A cystic tumour in the brain is not frequently encountered, and it is especially rare in so central a position and so remote from the base as in the present case. Of a hundred brain tumours, arranged according to their structure by Drs. Mills and Lloyd (5), only 2 per cent. were cystic, and a considerable if not the greatest number of them originated, apparently, from the pituitary body. Considering their relatively benign character, there is no obvious reason against life being maintained for many years in spite of their presence, provided they occupy certain localities in the brain. They are believed to have sometimes followed injuries to the head received in early life (6). It is, therefore, interesting to recall that in the present instance, such an origin of the cyst might be found in the somewhat severe injury to the head that was caused by the fall from a swing in the early childhood of the patient.

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THE SO-CALLED "EMPYEMA OF THE ANTRUM OF HIGHMORE IN INFANTS" (OSTEOMYELITIS OF THE SUPERIOR MAXILLA).

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Infants occasionally suffer from a disease characterised by redness and swelling below one eye, the formation of sinuses in this region and in the alveolus, and by a purulent discharge from the corresponding nostril. As these features resemble those of the classical "empyema of the antrum," the condition has usually been regarded as an infantile variety of this disease, hence the name. Cases of this kind have been published rather as curiosities, to record the early age at which an antral empyema may occur, than as contributions to the elucidation of the nature of the disease.

The affection is by no means common, as the small number of cases reported testifies. Brief epitomes are given below of those found in an extensive literary search, and of one occurring in my practice.

The following cases were described under the title of "empyema of the antrum":—

Case 1 (Rees).—Child, first seen when æt. 2 weeks, presented swelling and inflammation of left cheek with appearance of pointing below the eye, protrusion of eyeball, inflammation and chemosis of conjunctiva, left side of palate depressed, and ulceration of alveolar border with exposure of a rudimentary molar. The tooth was extracted, and on passing a director into the antrum, pus escaped. Next day, abscess near inner canthus was lanced; warm water injected into antrum flowed from wound in cheek. Swelling gradually subsided; opening in cheek and in mouth closed spontaneously after some weeks, and infant was cured. Rees has seen another similar case. In both he considers that the abscess of the antrum was due to pressure of the arch of the pubis on the infant's face during parturition.

Case 2 (Grandidier).—Child, æt. 6 weeks, presented swelling and redness of right cheek, eyeball pushed upwards, bulging of right half of hard palate and purulent discharge from alveoli after expulsion of teeth. No previous illness. Death on fourteenth day. At post-mortem examination the entire right superior maxilla was found necrosed. The condition was regarded as a periostitis of the upper jaw, leading to empyema of the antrum and terminating in necrosis.

Case 3 (Bouchut).—Child, æt. 2 months, after catching cold had a discharge of pus from left nasal cavity; two days later severe conjunctivitis; on following day, at site of left canine, abscess of gum, which burst and discharged for two days. Later, alveolar border softened and a second abscess formed. Ultimately all the maxilla softened. Treatment consisted in opening abscess and using emollient injections. Cured. The condition was regarded as a caries of the maxilla, following an inflammation of the nasal mucous membrane which extended to the antrum.

Case 4 (Fürst).—The presentation was normal, and delivery took place without instrumental aid. On the following day there was a yellow purulent discharge from the right eye and inflammation of the eyelids. The condition was treated as gonorrhœal conjunctivitis, and apparently improved. On the eighth day, however, blood-stained pus began to flow from the nose. About a fortnight later, on the twentieth to twenty-second day, a swelling formed at the inner angle of the right eye. This was at first small, but rapidly increased and extended to the outer angle. At the same time a watery secretion, which subsequently became purulent, flowed from the right nostril, and also forced a passage through the right upper alveolar border. Immediately after the formation of the swelling a rudimentary tooth was removed from the upper jaw; another was expelled, and the pus found an exit by the empty alveoli. Fürst first saw the child when 4 weeks old. She then presented a bluish-red fluctuating swelling, about the size of a pigeon's egg, in the region of the right malar bone, and marked hyperæmia and œdema of the palpebral conjunctiva; gonococci were found in the secretion. On pressing the swelling, pus escaped from the right nostril, and especially from the alveolus of the right upper second incisor; no gonococci were discovered in this pus. The corresponding half of the hard palate was soft but not swollen. Disinfecting solutions were syringed through the nose and alveoli. Subsequently an incision was made corresponding to the edge of the orbicularis, and abundant pus escaped. After three days there was a rapid loss of strength, and death from exhaustion followed. At the post-mortem examination it was found that the entire right upper jaw was destroyed. Abscesses beneath and amongst the fibres of the temporalis, and beneath the zygomatic process of the frontal bone, and multiple pyæmic abscesses on both sides in the lungs, kidneys, etc., and purulent pericarditis and pleurisy, were present.

Case 5 (Rudaux).—Infant, æt. 3 weeks, presented redness and swelling of the left eyelids, thrush of mouth and gums, and an erupted tooth below canine fossa. A few days later, on pressing suborbital region, pus escaped from left nostril and henceforward continued to discharge abundantly. Five days later the pus made another passage below the inferior eyelid. Rudaux saw the child when 2½ months old. He enlarged the infra-orbital fistula, removed small sequestra, and curetted. Six weeks later there was still discharge, and he then reflected a flap, opened the antrum, and established free communication between it and the nose. When 9 months old the child still had sero-purulent discharge from the nose. The case was regarded as one of suppuration of the maxillary sinus, due to the premature eruption of a tooth in the canine fossa.

Case 6 (Greidenberg's case, quoted by Moure).—Child, æt. 3 weeks, after crying constantly for twenty-four hours, presented swelling around the left eye, which next day increased and involved half of the face. At the same time redness developed beneath the eye, and in the left upper gum a tooth appeared in the course of a night, and fell out when touched. On the third day of illness, Greidenberg found a fluctuating area about a centimetre below the inner angle of the eye, on pressing which pus and blood escaped from the left nostril. The gum was gangrenous for a short distance. On the fifth day a vertical incision was made over the fluctuating swelling, and half a teaspoonful of pus escaped; an opening was made through the alveolus to communicate with the incision, curetted, washed, and packed. On the seventh day a fluctuating red swelling formed below and to the outer side of the first incision, and when opened the abscess cavity was found to communicate with the antrum. There was also a free passage from the wound on the face and from the alveolus into the left nasal fossa. Two days later the temperature became normal. Pus still flowed from the two wounds and from the nostril. Within twenty-eight days five sequestra were removed; after the extraction of each, the discharge ceased or diminished, but subsequently recommenced, the swelling and redness appearing anew. When the last sequestrum was removed, however, the purulent nasal discharge ceased, and the openings gradually closed. Two months after the first operation, the infant was cured. The author's diagnosis was—empyema of the maxillary sinus due to the too early appearance of a tooth.

Case 7 (D'Arcy Power).—The patient at birth had both sides of the face, especially the right, badly bruised by forceps. When a month old he seemed to have difficulty in closing his mouth, and refused the bottle. About the same time redness and swelling appeared below the right eye, and eventually an abscess was opened. When 8 weeks old he came under Power's care, on account of the discharging sinus. The right side of the face was found to be somewhat fuller than the left, and the skin of the lower eyelid and cheek was red and hot. On pressing the cheek, pus oozed from the sinus and from the alveolar border of the upper jaw. The upper part of the superior maxilla was felt to be bare. The sinus was enlarged and an opening made through the floor of the antrum, so that a drainage tube could be passed from the eyelid into the mouth. The child died ten days after the operation.

Case 8 (Douglas).—A fortnight after birth, the infant had "an ordinary sore eye." A week later, Douglas found the right cheek swollen, the right eyeball protruding, the eyelids hyperæmic, the conjunctiva congested, and the right side of the roof of the mouth bulging. Pressure on the cheek caused pus to exude from the right nostril. The antrum was opened from the outer side of the alveolus, and pus flowed freely; the cavity was syringed, the fluid escaping by the nose. The distortion of the right side of the face gradually subsided, the eye returned to its normal position, and the child is now in perfect health. There was no difficulty at birth, but for a week afterwards the mother's nipples were sore and discharging "matter."

Case 9 (Platt, quoted by Meyer).—Shortly after birth some swelling of the right side of the face was noticed, and a discharge from the nostril on the same side. An opening was soon formed on the lower edge of the right orbit, a little to the inner side of the middle line, from which pus escaped. Soon after, pus was seen to ooze from the right upper gum, about half way back. The infant, a female, came under Platt's care when 5 months old, and then appeared to be unusually healthy. There was no history of previous disease of any kind in parents or child. The following conditions were noted by him:—Slight swelling of right side of face, sinus below right eye as above described, scanty discharge of pus from right nostril, and small sinus in upper gum about region of second molar tooth. From this sinus a rudimentary tooth and some pieces of dead bone were removed, when a free opening into the antrum was found. On two subsequent occasions pieces of necrosed bone were removed from the sinus in the mouth. The discharge diminished rapidly, and the child when last examined was practically well. The condition was regarded as empyema of the antrum, due in all probability to gonorrhœal infection of the nose during birth. No bacteriological examination of the pus was made.

Case 10 (Shirlow).—Infant, æt. 9 months, was brought to Shirlow with an inflamed swelling in the left cheek, said to have been forming there for two or three days. Pus was discharging freely from the nostril of the same side. A fistulous opening was found in the alveolar border of the upper jaw, in the position where the first molar tooth might be expected to appear. A probe, passed through the opening, impinged on what seemed to be bare movable bone. On enlarging the opening this movable body was removed, and proved to be the perfect crown of a molar tooth. An antiseptic wash, syringed through the alveolar opening, flowed freely from the nostril. With daily irrigation the patient made an uneventful recovery in a few weeks.

The following cases are probably additional examples of the disease under consideration, but have been reported under designations other than that of "empyema of the antrum":—

Case 11 (Dujardin).—*Phlegmon of the orbit.*—The child was brought to Dujardin when 19 days old, for an affection of the left eye which had set in suddenly four days before. The eyelids were found swollen and red, exophthalmos was very pronounced, and the conjunctivæ were hyperæmic. The general symptoms were not severe. Poultices and ointment applied. Two days later the local condition was worse, and phlegmon of the orbit was no longer doubtful. After an interval of five days, fluctuation was detected at the inner part, and, on incising, a great quantity of pus escaped. On the following day more pus came, and some also escaped by the corresponding nostril and by the mouth. Ten days later the cure was complete.

Case 12 (Roure).—*Maxillary and orbital osteo-periostitis.*—When 10 days old, the conjunctiva of the right eye became red, and a day or two later slight exophthalmos was apparent. When 15 days old the exophthalmos was considerable and the right half of the face was swollen. On pressing the cheek, pus escaped from the right nostril. The corresponding alveolar margin was red, swollen, and presented two openings from which also pus oozed. Two teeth fell out. A probe could be passed through the openings into the antrum and an extensive bare surface felt. The lower eyelid was incised, and the probe passed along the floor of the orbit, which was bare, and down to the alveolar opening. Next day there was swelling and fluctuation in the region of the lachrymal sac; after incising, communication was found to exist with the other openings. At the same time an abscess at the upper and outer part of the orbit was opened. The fistulas were regularly washed and drained, and improvement was evident. The general condition, however, got worse. Abscesses formed in distant parts, and the infant died.

Case 13 (Schmiegelow).—*Osteomyelitis of the superior maxilla.*—The infant of healthy parents became suddenly fevered and had slight convulsions when 10 weeks old. Both lids of the right eye became very œdematous. At the same time there was swelling and tenderness of the alveolar process, and of the corresponding part of the hard palate.

The general condition was grave, the child lying in a dazed state. About a week later, a small abscess, which had formed on the inner side of the alveolar process opposite the canine, burst. Six days later the canine was extracted, and only then the pus found a free exit and the symptoms began to subside. Small sequestra were expelled frequently. Foul pus flowed from the left nostril. The general condition improved. When the child came under Schmiegelow's care about two months after the onset of the illness, the right cheek was swollen, pus welled from the right lachrymal sac, and there was marked periosteal swelling of the alveolar process which extended over the hard palate to the middle line. A discharging fistula marked the site of the canine tooth. Behind it a loose rudimentary tooth was seen, on removing which a quantity of pus escaped. The right nasal cavity contained foul pus, and its lateral wall was broken down and sequestra met with in all directions. Regular syringing was prescribed; fluid injected through the alveolar fistula escaped by the nose. Two months later the swelling of the superior maxilla had diminished. Three years later the patient had thriven, but there was still discharge from the right nasal fossa.

CASE 14 (Röpke).—*Acute osteomyelitis of the upper jaw.*—A healthy infant, at the beginning of his second week, did not take the breast well, and cried constantly. Swelling of the left cheek and purulent discharge from the left nostril were then noticed. On the following day the left eye was swollen. When 14 days old the infant came under Röpke's care, who found the condition as noted, besides bulging of the left half of the hard palate and several fistulas. The crown of the molar tooth lay loose in granulations of the alveolar process. The probe encountered necrotic bone in every direction. The granulations were removed, the cavity irrigated and packed. Three days later, improved. Two days later, digestive disturbances set in, the infra-orbital swelling increased, and the nasal discharge was more copious. An abscess opened in the infra-orbital region. The child became weaker, and died sixteen days after operation.

CASE 15 (Röpke, Case 2).—A strong boy, æt. 7 months, who had never been ill before, became fevered and presented marked swelling of the left upper jaw. An abscess in the region of the left molar was incised. The swelling of the face increased, however, so that the eye could not be opened. Röpke now found swelling of the hard palate extending to the middle line, and of the alveolar process on the left side. Foul pus escaped from a fistula in the canine fossa and from the left nasal fossa. The outer wall of the latter was carious. In the region of the zygomatic arch there was great swelling without fluctuation. An opening was made in the canine fossa; the anterior wall of the superior maxilla and the lower orbital wall were found necrosed, and scraped; and a large sequestrum was removed from the malar process. The wound was regularly cleaned and packed. After nine months there was still a fistula in the canine fossa, and sequestra were occasionally discharged. The left half of the face was slightly sunken.

CASE 16 (Avellis).—*Tuberculosis of the superior maxilla.*—In an infant, æt. 6 weeks, an abscess formed below the left eyelid, pointed, and a fistula resulted, from which small pieces of bone escaped; a foul purulent discharge came from the left nostril. Avellis saw the child when 15 months old, and found the anterior wall of the left superior maxilla and the corresponding half of the hard palate prominent. The floor of the nose was rough and bare; a few tuberculous bacilli were found in the discharge. A flap was raised, the superior maxilla scraped, a piece of bone and carious tooth removed. The wound and fistula healed, but the discharge from the nose continued.

The following case was under the writer's care:—

CASE 17.—Peter —— was a strong and apparently healthy infant until 14 days old. Both lower eyelids and cheeks then became swollen. On the right side the swelling was never considerable, soon subsided, and gave no trouble; on the left, however, it increased rapidly and was acompanied by protrusion of the eye. In a day or two pus began to flow from the eye, the left nostril, and the posterior part of the left half of the upper jaw. The eyeball now returned to its normal position, and the swelling of the cheek in a great measure subsided. The discharge from the eye continued for a month, that from the nose and mouth was still going on when the child, æt. 4½ months, was brought to me.

I found the patient well-nourished, with slight swelling of the cheek on the affected side, but an apparently normal eye. There was an abundant foul purulent discharge from the left nostril, and about the site of the left upper first molar pus was escaping, and a hard white mass was seen which the mother affirmed had been there for long. This was easily detached, and proved to be the inverted crown of the first molar. The rest of the tooth was gone, and the cavity of the shell which looked downwards was filled with a large granulation springing from the gum.

After enlarging the sinus opening on the alveolus, a probe could be passed into a comparatively large cavity, and water injected escaped by the nose, carrying with it a small quantity of pus.

Syringing was now practised regularly for several weeks, but a sanious discharge from the nose continued. Examination of the left nasal fossa with the probe then revealed necrosed bone on the floor and lower part of the outer wall. The removal of several sequestra was followed by cessation of the purulent discharge and rapid improvement in his general health.

When seen recently, he was 7 years of age, and a well-developed though not very robust boy. His mother informed me that he had never had any teeth in the left half of the upper jaw, with the exception of the second molar. In his nose, the only abnormality I could discover was a small synechia between the septum and the middle of the inferior turbinate.

With the view of elucidating the cause of the child's illness, inquiry was made as to the possibility of injury to the face during or after delivery, but without obtaining any evidence relative thereto. No history could be elicited of venereal disease in the parents, who had a large and healthy family. On questioning the mother as to the presence of discharges about the time of the patient's birth, I learned that eight to ten days after her confinement, when she had begun to attend to the household duties, a discharge set in, accompanied by painful micturition. This condition lasted four or five weeks, and then passed off spontaneously.

From a perusal of the above reports, it would appear that the disease under consideration usually presents the following features:—

The subject, as a rule, is a healthy infant, 2 or 3 weeks old. The age at the onset in the cases described was "shortly after birth," 8, 8, 10, 10, 14, 14, 15, 21, and 21 days, 1, 1½, 2, 2½, 7, and 9 months respectively. General symptoms, *e.g.*, constant crying, fever, slight convulsions, may usher in the illness. The first local manifestation is nearly always swelling and redness of the eyelids on the affected side, occasionally leading to closure of the eye. In some instances the inflammatory process involves more particularly the cellular tissue of the orbit, and causes pronounced conjunctivitis and exophthalmos. The swelling of the eyelids may extend downwards to the level of the naso-labial sulcus. After a variable interval of usually two or three days, an abscess forms below the inner angle of the eye, and may subsequently burst, or pus may flow from the lachrymal sac. About the same time a purulent discharge from the corresponding nostril sets in, and it is found that this is increased by pressing upon the infra-orbital abscess. On examining the mouth, swelling of the underlying alveolus and bulging of the corresponding half of the hard palate are evident, probably also a partially erupted molar or canine. The removal of the rudimentary tooth, which is but loosely attached, gives free vent to pus. A probe passed into the resulting gap enters a fairly large cavity, which is really a dental sac, but is commonly thought to be the antrum. Fluids injected into this cavity may escape by the nose. On probing the fistulas, and the lateral wall of the nose on the affected side, necrosis may be detected.

The further course of the disease varies. If the pus escapes freely, and the patient's general condition is good, after a longer or shorter interval, during which sequestra may be discharged or removed, the suppuration may cease, and the sinuses close. On the other hand, the presence of diseased bone may maintain the discharge indefinitely. In not a small proportion of cases, death has resulted from inanition, or septic infection.

Having dealt with the clinical picture of the disease, we now pass to the consideration of its pathogenesis.

Of the above series of seventeen cases, the first ten were regarded as examples of empyema of the antrum; two were diagnosed respectively as phlegmon of the orbit, and maxillary and orbital osteo-periostitis; three as osteomyelitis of the upper jaw; and one as tuberculosis of the upper jaw.

It is easily understood how this condition came to be regarded as empyema of the antrum. Its clinical features closely resembled those of an affection occurring in adults, which until recently was described under the name of empyema of the antrum. In such cases it was supposed that the inflammation extended from the nose into the antral cavity, and led to swelling of its lining membrane and blocking of the ostium; that the inflammatory products were retained, and continued to accumulate until they forced a passage externally, or into the mouth or nose; and that the necrosis resulted from the severity of the disease. We now know that such a course of events probably never follows a simple inflammatory process, but is due to the growth of a membrane, cyst, or solid tumour within the antrum.

If the antrum of an infant and its anatomical relations are considered, it will be evident that an empyema, while theoretically possible, could not give rise to the train of grave symptoms that has been sketched.

In order to elucidate the matter, sections were made of the superior maxillæ of newly-born infants. Fig. 1 is a coronal section displaying the left nasal cavity, part of the orbit, a dental sac, and the antrum; the last has been cut so as to show its vertical and lateral dimensions at their greatest. It is evident from the drawing that the antral cavity is much smaller than the dental sac, and that the latter, owing to its size and position, might readily be mistaken for the former. Further, assuming secretion to go on within the antrum while its orifice is blocked, rupture would take place into the nose through the thin partially fibrous wall, and not through the comparatively thick bone into the dental sac or soft tissues of the cheek. These considerations justify the exclusion of antral empyema as the cause of the disease in question.

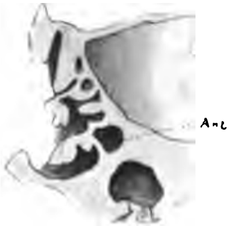

FIG. 1.—Section of left superior maxilla of newly-born child, showing antrum, cavity of dental sac, and nasal turbinals.

In the case reported under the title of "phlegmon of the orbit," a too limited view has been taken of the condition. Although pus was discharged from the nose and mouth, the fact is mentioned only incidentally.

The credit of pointing out what appears to me to be a more correct explanation of the nature of the disease than any hitherto advanced, belongs to Schmiegelow. He considered that the group of symptoms above described is due to acute osteomyelitis of the upper jaw. This view is supported by the acute onset, the thorough implication of the superior maxilla (causing it to become prominent in all directions), the limitation of the morbid process to this bone, and the rapidly resulting extensive necrosis.

Lastly, Avellis discovered a few tubercle bacilli in the child (Case 16) that was under his care, and consequently regards not only his case, but all cases of the disease in question, as due to tuberculosis of the medullary tissue of the nasal and palatine process of the superior maxilla. This generalisation is hardly warranted. A microscopic examination is not mentioned as having been made in the other cases above reported, and there was nothing in the condition of the patients or in their family histories to support a diagnosis of tuberculosis; further, the onset, course, and termination of the affection differed from these phases in undoubted cases of tuberculosis of the superior maxilla.

Before proceeding further, let us briefly consider whether an affection similar to the so-called "empyema of the antrum" in infants occurs in adults, and if so, whether the features—which can be much more easily investigated in those cases than in the very young—throw light on the pathogenesis of the disease.

To the former question an affirmative reply may be given. Cases have been observed by myself and others in which the morbid process was evidently of the same nature as that under consideration. Thus, Lichtwitz reports a case of acute osteomyelitis of the superior maxilla in a man æt. 29, who, in consequence of having been struck in the region of the left canine fossa by a copper tube, suffered from recurrent swelling of the left half of the face, a discharge of pus into the mouth from the alveolus of the upper left lateral incisor, and a similar discharge from the left nostril. The whole left alveolar border formed a large sequestrum, on the removal of which all the symptoms passed off. The antrum was examined, but contained no pus. The discharge from the nose had found its way into this cavity, not through the antrum, but by a fistula which opened beneath the inferior turbinate.

Another somewhat similar case which came under my care is that of a man who, after a spree, awoke to find himself on a hillside, with his head resting on a stone. A day or two later the left cheek swelled greatly, and the left half of the hard palate became markedly depressed. Shortly afterwards a sinus opened upon the cheek and another above the gum. Three months later, when he came under my care, a large cavity was found in the jaw, between the floor of the antrum and the roots of the teeth. The cavity was full of granulations, and in connection with the sinuses mentioned and with the nose; a considerable extent of the neighbouring bone was carious.

It cannot be denied that a great similarity exists between the cases above referred to of acute osteitis or osteomyelitis of the superior maxilla in adults and the infantile affection termed "empyema of the antrum." I am of opinion that the pathological process is essentially the same in both classes of patients, and that any clinical dissimilarity may be accounted for by the anatomical differences which exist between the fully developed superior maxilla and this bone at birth. In its latter state it is spongy, penetrated by numerous foramina, and largely occupied by dental sacs. Inflammation of any part of the bone would readily extend throughout it, cause rupture of a dental sac, and extrusion of the rudimentary tooth, and lead to swelling, necrosis, and the formation of a sinus on one or more of its surfaces—facial, palatal, orbital, or nasal.

In adults, on the other hand, the body of the superior maxilla is occupied by the antrum, whereby the morbid process in the bone is more limited, so that it is exceptional for more than one or two of its bony walls to be affected. Hence the disease, when contrasted with that occurring in infants, is more localised, accompanied by less general disturbance, followed by less destruction, and is much less fatal.

It has already been shown anatomically that the so-called antral empyema of infants has little, if any, relation to the antrum. The same may be said of its counterpart in adults. In the two cases quoted, as well as in the large majority of milder cases investigated by me, in which one or more of the bony walls of the antrum were diseased, the cavity itself was normal, and in no instance could the bone disease be attributed to an empyema of the antrum.

Assuming that the so-called empyema of the antrum in infants is of the nature of an acute periostitis, osteitis, or osteomyelitis of the superior maxilla, and judging from the etiology of these affections in the adult, one would consider trauma, cold, infection, and the tuberculous and syphilitic diatheses as the most probable causative factors. On examining the clinical histories of the recorded cases, this view is found to be amply justified, as will now be shown.

A traumatic influence has most frequently been regarded as the exciting cause. In the two cases observed by Rees, there had been a face presentation, and to this was ascribed injury of the superior maxilla. Spencer Watson has also seen two cases in which he considered the mischief was probably connected with injuries received during parturition. In D'Arcy Power's patient there had been bruising of the face during delivery with forceps; and in Dujardin's the lower eyelid had been scratched at birth. On the other hand, in several of the cases, as also in my own, labour was normal, and no injury was incurred by the infant.

Rudaux and Greidenberg attributed their cases to the premature eruption of a tooth; this, however, is really a consequence and not a cause of the disease.

In Bouchut's case, cold in the head marked the onset of the illness.

In the majority of instances the parents were healthy; no mention is made of any of them having been tuberculous; and only one is stated to have suffered from syphilis. Nor has anything been noted in regard to the general health of the infants that would indicate a special predisposition in those attacked.

The part played by infection is doubtful, as little has been done in the way of bacteriological research. In Fürst's case there was undoubted gonorrhœal conjunctivitis, which was proved by the finding of the gonococcus, and in this writer's opinion the inflammation travelled by the naso-lachrymal canal to the maxillary sinus, and there set up suppuration, with softening and destruction of the surrounding bone. Platt considered that the antral empyema in his patient was due in all probability to gonorrhœal infection of the nose during birth. A medical friend has related to me a fatal case of "empyema of the antrum" in an infant, the mother of which at the time of confinement had gonorrhœa. In Roure's case the mother suffered from metritis and septic vaginitis during the last months of pregnancy. The mother of Douglas's patient had sore nipples, which discharged "matter." Schmiegelow and Röpke also believe that infection takes place from the nose. Lastly, in the case reported by me, the mother began to suffer from a discharge, the nature of which cannot be determined, a few days before the patient presented the first symptoms of illness.

It will be observed that in the above cases the relation of gonorrhœa to the "empyema" is altogether conjectural, and that the gonococcus was not found in the nasal secretion of any of the cases. Our knowledge of nasal gonorrhœa in both adults and infants is very imperfect; indeed, the affection is not even mentioned by the majority of rhinological authors. In no instance, however, have grave structural changes been reported as resulting from an attack. Störk, who has written perhaps most fully on the subject, describes two cases in adults, the principal symptom in whom was a very profuse nasal discharge. The coryza in infants, which is not infrequently associated with ophthalmia neonatorum, is not specially severe, and has been shown to produce no pathological changes in the nasal mucous membrane (Rosinski). It follows, therefore, that even if gonorrhœal rhinitis has been present in the above cases of empyema, it is not likely to have caused extensive necrosis of the superior maxilla, and that this destruction, if the result of an infective process, was due to organisms other than the gonococcus.

That the disease may sometimes be of an infective nature is possible, but in the absence of data we must meantime remain ignorant of the mode and site of entrance of the micro-organisms.

Contrary to the view generally entertained, I regard the alveolus, and not the nose, as the part first involved in consequence of injury or of infection. For, from a survey of the cases, it is evident that the anterior surface of the superior maxilla is the site of the earliest manifestations of the disease, the nasal discharge setting in later. Besides, if the infection travelled by way of the nose and antrum, we would expect nasal symptoms to be invariably present, whereas in several cases, two of which terminated fatally, there were no nasal symptoms. Again, we would expect that in some patients there would be only nasal symptoms, the morbid process exhausting itself or being cut short before other complications developed; of such cases we have no knowledge and can find no record.

On the other hand, all the cases of the above series showed pathological changes in the mouth; a sinus had formed in the alveolus in every instance excepting two, and in these there was bulging of the hard palate on the affected side. There is no doubt, too, that cases do occur in which the alveolus is primarily and severely affected, while nasal symptoms are absent. The following case reported by Wood bears out this statement:—

Acute necrosis of alveolar process of superior maxilla.—Two days after birth, the delivery having been normal but tedious, the child had slight chemosis of both eyelids. Next day the alveolar process of the left superior maxilla was much swollen. On the following day there was extensive sloughing. After removal of the slough, two pieces of bone were extracted. The child progressed favourably until the twelfth day, when an erysipelatous eruption appeared on the abdomen; it died on the fifteenth day, apparently from sapræmia.

It will be gathered from what has been stated that in my opinion the disease is caused by influences of a traumatic or infective nature, more probably the former, acting on the alveolus. The most vulnerable parts of the latter are the dental sacs, of which that of the first molar is especially liable to suffer, owing to its large size and prominence (Fig. 2).

This sac I believe to be the seat of origin of the mischief. In short, I regard the condition commonly designated "empyema of the antrum in infants" as primarily an acute inflammation of the dental sac of the first molar, the inflammation subsequently involving more or less of the superior maxillary bone. Let us see how far this view is in accord with the various clinical features.

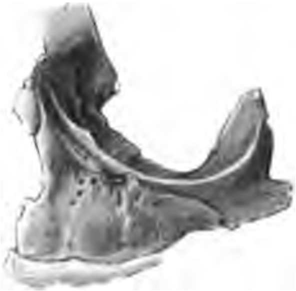

FIG. 2.—Left superior maxilla of newly born child. Facial aspect, showing prominence caused by dental sac.

Of these the chief are—The extrusion of the crown of the rudimentary tooth, which may be attributed to pressure within the sac; exophthalmus; the presence of swelling and the formation of sinuses upon the cheek or palate; and the discharge of pus into the nose, all of which manifestations may be accounted for by the close proximity of the sac to the regions involved; lastly, the ultimate, more or less extensive, caries of the spongy bone enclosing the sac.

The early treatment of these cases consists in providing a free escape for the pus. The opening should be made in the alveolus or canine fossa, where there is indication of pointing, or, if a sinus has already formed in either of these situations, it should be enlarged. Regular syringing should then be carried out. The passage of pus into the mouth should be guarded against as far as possible, in order to lessen the risk of absorption and the consequent generalisation of the infection. It is probably best to proceed not too energetically; the expulsion of sequestra may be aided, but it is doubtful whether a radical operation should be attempted; apart from the disfigurement which is liable to follow such a procedure, the results of the operations hitherto performed have on the whole been discouraging.

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THE TREATMENT OF THE MUSCULAR, HÆMIC, AND MECHANICAL FACTORS IN HEART DISEASE.[1]

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Lecture I.

The Treatment of the Muscular Factor in Heart Disease.—In a lecture which I gave here last year, I dealt with the neural factor in heart disease.[2] I propose in this lecture to speak of the muscular factor, and in the next of the hæmic and mechanical factors. But, while we may thus analyse the factors which underlie cardiac action, we must not forget the union of their influences in carrying out a common purpose, or fail to remember, that in remedying a defect in the territory of one of these, we indirectly promote the better action of the others. The mechanical or valvular factor, while it may be mainly responsible for the disturbed action of the heart in some cases, can, however, only be influenced for better or for worse by our action upon the other factors. The muscular factor in carrying on the circulation of the blood is (1) visceral and (2) somatic or skeletal.

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[1] Lecture delivered at the London Polyclinic in February 1904.

[2] *Edin. Med. Journ.*, March, 1904.

The cardiac muscle has characters, as we know, which appear to constitute it a transition structure between voluntary and involuntary muscular fibre. It is the only striped visceral muscle in the body. It has an inherent power of rhythmical contractile action which manifests itself before, in the embryonic state, its ultimately regulative nerves have reached it. This rhythmical action is not limited exclusively, as we know, to the heart, for it is possessed by the larger veins which empty themselves into the right side of the heart, and in some of the lower animals lymph sacs are also known to possess this faculty. The middle coat of the arteries is also well developed and innervated muscular tissue, and actively assists in the maintenance of the blood flow.

But, leaving the vascular pump and its afferent and efferent channels, the circulation of the blood is likewise influenced directly and indirectly by muscular structures which surround the arteries and veins of the body and by those which carry out the respiratory function. These are either purely voluntary, like the muscles of the limbs, or partly under the control of the will, like the muscles of respiration. In rare instances, indeed, it has been maintained that the power of the will may be manifested in control of the cardiac muscle itself. All purported cases of the latter class, however, must be open to doubt, and any influence exerted in these circumstances is probably secondary to a voluntary control of respiration.

There is, as I have stated, reason to believe that portions of the lymphatic system have a rhythmical power, but there is no question that the lymph flow is chiefly influenced by respiration, blood pressure, and general muscular action and tone.

A final rhythmical action which may have a subsidiary influence on the circulation, and is due, perhaps, more to elasticity than to direct muscular action, is the rhythmical motion of such organs as the spleen and kidney. But we know that the spleen also contains a good deal of unstriped muscular tissue, and therefore the rhythm is probably due in a measure to this. It is manifest, then, that disablement of the muscular and rhythmical actions involved in the circulation is of vital importance in those diseases and disorders of the circulation with which we are called upon as physicians to contend, and it behoves us to know, not only *what* we can do to assist the muscular factor in the heart's action to contend with impediments to its normal working, but also by *what means* we can come to its assistance, and *how* we can do so with best effect, under the various circumstances of impaired circulation met with in practice. Semi-detached as the visceral muscles are from the voluntary system, it is possible for one or other to be disabled very largely without involving a deterioration of the other. The man who suddenly dies of cardiac failure from fatty degeneration of the heart, may be capable of active exercise until the day of his death; and we know that there may be much loss of power in the skeletal muscles from various causes, without impaired action of the heart or disease of the blood vessels. But the obese and inert man, whose voluntary movements are impeded by fat pressure in the skeletal muscular system, may also be the subject of a cardiac fatty infiltration which impairs the power of his heart, and with this central failure the action of other organs in his body.

If, then, we are to act with benefit upon the muscular factor in heart disease, we must be able to influence the visceral muscle irrespectively of the means we may employ to influence the skeletal muscles, as well as be in a position to treat defects in the voluntary system apart from any power we may be able to exert upon visceral motion. Fortunately for us who live in these days, the necessities of man, and his struggle to live, combined with the human faculty of inquiry into the nature and causes of things, has supplied us with agencies, frequently in the first instance of empirical discovery, which science (that is, observation and deduction) has taught us how to use with most advantage, and as time progresses, and our experience enlarges, either for us as individuals or as a race, it will teach us more and more how best to employ such remedies. It was by an inquiry into the truth or error of the casually expressed opinion of a milkmaid as to the preventive influence of cowpock upon smallpox, that Jenner immortalised himself and rendered signal service to the race. It was thus also (as he tells us in his "Account of the Foxglove and some of its medical uses") that William Withering of Birmingham, asked his opinion in 1775, concerning a family receipt for the cure of dropsy, brought within the sphere of practical medicine that digitalis, without which, or its subsequently discovered congeners in action, we could have little power to-day over the muscular factor in heart disease. Not that Withering appreciated the fact that the agent he employed acted upon the heart, for in that day clinical observation was directed towards the effects rather than the causes of disease. Certain dropsies were found to be relieved or cured by the foxglove, while others were unaffected by it. On one occasion, indeed, as mentioned in the classical work referred to (p. 143 *et seq.*), Withering and a correspondent of his, Dr. Stokes of Stourbridge, were confronted with a fact which, had it then been appreciated aright by them, would have advanced cardiac therapeutics by half a century. A Mrs. M., who suffered from orthopnœa, pain, and excessive oppression at the bottom of the sternum, had an irregular pulse with frequent intermissions, and anasarcous legs. She was treated with infusion of digitalis and was relieved of her troubles, but after some months died. The body was examined after death, and among other conditions mentioned as existing was the presence of 4 oz. of blood-stained serum in the left pleura, while the aortic valves are stated to have been "of a cartilaginous texture as if beginning to ossify." The remark made upon this case is, that "the intermitting pulse should seem to have been owing to effusions of water in some cavities of the breast, as it disappeared on the removal of the water" (p. 146). Had the effect not been mistaken for the cause in this case, what an advance would have been made in clinical medicine! I need scarcely say that it is not in any spirit of twentieth-century pertness that I make this remark, for there are few men of Withering's clinical acumen alive to-day, but I refer to it as a very interesting episode in the history of the treatment of the muscular factor in heart disease. Indeed, the rules which Withering gives towards the end of his book for the use of digitalis may be read with instruction by any physician of the present day; and I shall go further, and state that there are few to-day who know so well as Withering did, how to use that potent drug. But, enough of history.

Of the other agents of the digitalis group, mention need only be made of strophanthus and scilla, for convallaria, cactus, and ergot are rarely employed in the treatment of the muscular factor in heart disease, when it has failed.

Strophanthus, introduced into medical practice by Dr. (now Sir) Thomas R. Fraser of Edinburgh, has qualities which render it very useful either in combination with, or as an alternative to, the use of digitalis. It acts more rapidly on the heart than the latter, less constrictively on the peripheral vessels, is less irritating to the intestine, and is non-cumulative. The reputation of squill in this connection is chiefly based on the fact of its entering into the composition of Baillie's pill, to which I shall again refer.

If we place beside the account given in any of our modern pharmaceutical text-books of the chemical constituents of digitalis and the properties of its several ingredients, the information on these points given by Withering, we can see at a glance the great progress which has been made in organic chemistry since his time. But I know of no passage in medical literature which shows better than this one, the cogitative and progressive faculty of the human mind. It is a specimen of inductive prophecy, and is worthy of quotation.

"As the more obvious and sensible properties of plants," he writes, "such as colour, taste, and smell, have but little connection with the diseases they are adapted to cure, so their peculiar qualities have no certain dependence upon their external configuration. Their chemical examination by fire, after an immense waste of time and labour, having been found useless, is now abandoned by general consent. Possibly other modes of analysis will be found out which may turn to better account; but we have hitherto made only a very small progress in the chemistry of animal and vegetable substances. Their virtues must therefore be learnt either from observing their effects upon insects and quadrupeds, from analogy deduced from the already known powers of some of their congeners, or from the empirical usages and experience of the populace" (p. 1).

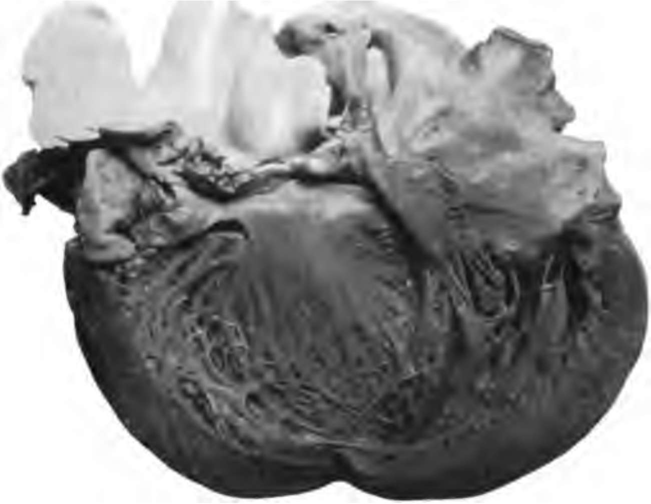
We know now that the active principle of the leaves of the foxglove is itself a compound of four glucosides of varying solubility and activity, namely, *digitalin*, *digitalāin*, *digitoxin*, and *digitonin*. These facts are of practical importance, for the glucosides mentioned are not all contained in the various preparations used. Thus, while digitaläin is soluble in water, neither digitalin nor digitoxin are thus soluble, but are contained in the tincture, or in special preparations, such as Homolle's and Nativell's digitalin. Digitoxin, the most powerful of the ingredients mentioned, is the chief constituent of the preparation sold as Nativell's digitalin. The powder, of course, contains all the constituents of the plant, just as opium contains all its alkaloids, and imparts the chief potency to Baillie's pill.

This group, then, in medicinal doses, constitutes our means of acting upon the heart and circulation by increasing the power of systole, reducing the rate of the heart, and improving cardio-vascular tone generally.

In the nitrites, on the other hand, we have agents which act upon the heart and blood vessels by quickening and lowering the force of the former, and by increasing the calibre and diminishing the contractility of the latter. It is now generally accepted that the nitrites act chiefly upon the muscular factor in the organs of circulation.

Holding a position midway between the digitalis group and the nitrites is the belladonna group of agents—belladonna, stramonium, hyoscyamus. These, of which belladonna is that chiefly used in disorders of the circulation, tend as an initial action to slow the heart and raise the blood pressure—an effect which soon yields to quickened pulsation and vaso-dilation. Unlike the nitrites, its action upon the muscular element appears to be secondary to its effect upon the central and peripheral nervous system. In thus acting upon the cardio-vascular mechanism through the agency of the nerves, the belladonna group resembles the chief representative of the medullary stimulants, namely, strychnine.

The mechanism of the action of *mercury* upon the heart may be disputed, but of its value, both alone and as an adjunct to other agents acting upon the muscular factor, there can be no doubt. The disordered circulation which has resisted digitalis and other agents, even when the patient is otherwise surrounded with every advantage for successful treatment, may be repeatedly found to yield to the same remedies when they are used conjointly with mercurials. Baillie's pill, for some reason now inexplicable, frequently called the Guy's pill (for Matthew Baillie, the nephew of John Hunter, was attached to St. George's, not Guy's), and which consists of powder of digitalis and squills with blue pill and hyoscyamus, acts in many cases of cardiac failure almost as a charm. The particular formula which I have chiefly used is that found in the Pharmacopœia of the Great Northern Central Hospital, in which there is a grain each of blue pill, powder of digitalis, and powder of squill, and 1⅔ of a grain of extract of hyoscyamus. In arterio-sclerotics especially, with persistent or occasional arhythmical action of the heart, and in whom the kidneys are sound (except when albumin in the urine is due to circulatory causes), I have found this particular pill most useful, and have patients who have taken it more or less continuously for years with nothing but benefit. There are certain agents, such as *quinine*, which increase the contractile action of the spleen as a rhythmical viscus, and all tonics probably have more or less the power in medicinal doses of stimulating visceral reaction and motion generally. These agents, then, may be taken as the chief types of our means of acting upon the visceral muscular factor in heart disease. How can we employ them most usefully? Let us consider this point in its application to the use of the *digitalis group*. They are the pharmacological antagonists to cardiac dilatation, and cardiac dilatation denotes the loss of irritability of the cardiac muscle and its yielding before the distensive action of residual blood in the chambers of the heart. These chambers, as we know, have a varying power, and a correspondingly varying resistance to distension by accumulated blood, the left ventricle being more powerful in all respects both actively and passively. Even without valvular disease or degenerated muscle fibre, functional disorder, such as tachycardia, will notably dilate the heart, and this dilatation is chiefly manifested by the chambers behind the left ventricle. The left ventricle under these circumstances plays in the heart the part of obstructive conditions at the neck of the bladder in that viscus. The indications for treatment are, not only to relieve the organ of accumulated fluid, but to act upon its walls so as to restore and maintain its irritability, by raising its power to resist dilative influences. We shall deal more fully with the hæmic factor in the next lecture. In this, we are concerned chiefly with the question of raising the power of the walls of the viscus—with, in short, the muscular factor. The muscle of the heart may be so degenerated as to render such a restoration



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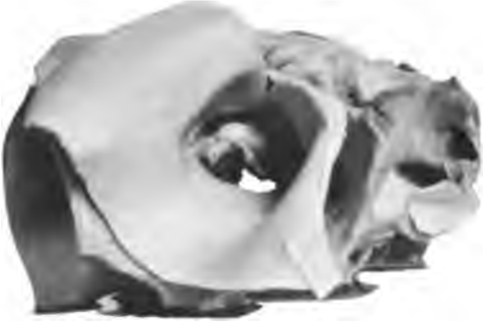


FIG. 9.

impossible, but, even in degenerated hearts, there is a residuum of comparatively healthy fibre which may respond to the pharmacological antagonists to dilatation. In cases, however, having an intrinsically poor muscle, we have to use the digitalis group in small doses and with caution, only very tentatively increasing the dose, and never rising to those quantities which are seen in all their power and usefulness, when dealing with enfeebled and stretched muscle, which is, nevertheless, intrinsically sound. In such cases the drug or drugs, boldly used in doses varying from 15 to 25 or 30 minims, frequently show their power even *in extremis*. The benefit may be temporary or it may be more or less permanent. As an example of the first, I may relate some details of a case which was under my care at the Great Northern Central Hospital last year, and I do so, not only because the power of the digitalis group was well evinced by it, but also because I obtained instructive sphygmograms of the case, and, as it ultimately unfortunately died, I am in a position to show you the nature of the condition with which these agents had to contend.

W. T., æt. 36, a baker, was admitted into the Great Northern Central Hospital on 8th September 1903, suffering from aortic valvular disease with dyspnœa and anasarca. He was treated by rest in bed and general care. Although a mixture containing 5 minims of tincture of digitalis and 3 grs. of caffeine was prescribed on the 10th of September, it seems to have been abandoned on the 11th for an expectorant mixture containing 20 minims of tincture of squills, and his cough was symptomatically treated with heroin. On 25th September, a mixture containing 2 drms. of infusion of digitalis and 10 grs. of diuretin was prescribed, together with a mercurial pill and white draught. He also took a hypnotic. The digitalis mixture seems to have been abandoned on the 2nd of October. The note made at the time was, I find, that the patient had a "mitral rather than aortic aspect; his pulse was of low tension and irregular . . . the bases of his lungs were not clear," and that there were "numerous crepitant râles." His urine had also diminished in quantity, and contained albumin. On the 3rd of October six leeches were applied over the precordia. The patient was first seen by me on October the 6th, when he was orthopnœic, and had anasarcous legs and abdominal wall; the area of cardiac dulness was increased; there was a double basic bruit, best heard to the left of the sternum, and a systolic bruit at the apex. A mixture containing 12 minims of tincture of strophanthus, 30 minims of liquor of the perchloride of mercury, 5 minims of liquor of strychnine, and 20 minims of the spirit of nitrous ether, was prescribed to be taken three times a day. The prescription did little good. The anasarca increased; the lungs became more engorged; the jugular sounds of right auricular tension could be heard over the sterno-clavicular insertion of the right sterno-mastoid muscle; the patient slept little, was orthopnœic, and, in short, presented all the well-marked features of cardiac failure in its last stages.

Southey's tubes were now inserted into his legs as a preliminary to the bolder use of digitalis, and in the three days from the 13th to the

16th of October, 18½ pints of fluid were thus drained away, reducing the bloated appearance of the patient, and abolishing, on the day after their use, the jugular evidence of auricular tension. The pulse on the 14th was small and irregular, as may be seen in Fig. 1, the breathing shallow, the cardiac bruits faint in sound, and the urine contained one-sixth of albumin. On the 14th, that is on the day following the drainage of the anasarca, I prescribed a mixture containing 15 minims of tincture of strophanthus, 10 minims of tincture of digitalis, 5 minims of the liquor of strychnine, 15 minims of aromatic spirit of ammonia, and 30 minims of spirit of nitrous ether in each dose. One dose was to be given every four hours. I again saw the patient at the hospital on the afternoon of the 16th, when he had taken twelve doses of this mixture, that is, 300 minims of the combined tinctures of strophanthus and digitalis, 60 minims of the liquor of strychnine, and 6 drms. of the spirit of nitrous ether. I found him lying peacefully in bed, with a pulse, as will be seen in Fig. 2, of 48 to 54 at the wrist, with an intermediate abortive systole as shown by the tracing. The patient complained of feeling a little sick, but also stated that he felt much better. The cardiac area, so far as could be determined by percussion, measured 4½ by 5 in.; the basic bruits were loud, rough, and slowly uttered, and the apical bruit had assumed a musical pitch. The ventricle, in other words, was contracting, the heart acting with greatly increased force, and the chambers of the organ emptying in proportion. The use of digitalis and strophanthus, in view of these circumstances, was discontinued, but their effects for a time persisted, as may be seen in Fig. 3, which I took on the 17th. Here the pulse wave is still full, and the abortive systole has been replaced by a complete systole. The house physician's notes of the case for this day state that "the patient's sleep (was) good, (his) pulse slow, about 72, (and) fairly steady." A distress-

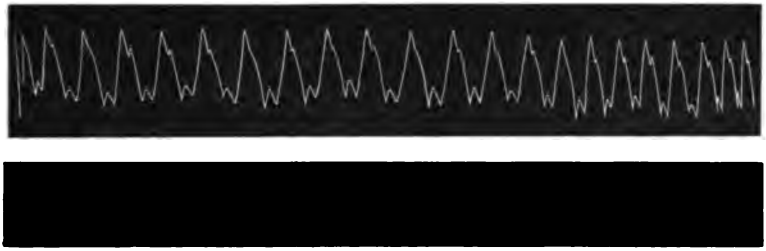
Fig. 1.

Fig. 2.

Fig. 3.

ing cough, too, had diminished, but, on auscultation, œgophony could be heard at the base of the right lung posteriorly, where there was also some dulness. This was the signal of further trouble, which turned the scale against the patient, for fluid began to collect somewhat rapidly in the right pleural cavity. The breathing again became embarrassed and the anasarca of the legs increased. The pulse quickened, but for a time remained of good tension, as may be noted in Fig. 4. Southey's tubes were again inserted into the legs, and drained fairly, but not so freely as before. Sixteen ounces of serous fluid were aspirated from the right pleural cavity, and the full doses of digitalis and strophanthus resumed, but without benefit (Figs. 5 and 6), the patient dying rather suddenly during the night of 27th October. The heart, regarded as a jaded horse, had pluckily jumped its last ditch under stimulation a fortnight previously, and now, in spite of spur and whip, floundered exhausted at the last attempt to leap.

FIG. 4.



FIGS. 5 and 6.

The necropsy next day revealed a bovine heart weighing 36 oz., with contained clots, dilated and hypertrophied in all its chambers, which also all contained blood; and with a well-marked aortic lesion (Plate V. Fig. 7). One of the cusps is transformed into a calcified dendritic mass, the evidence of some previous attack of ulcerative endocarditis, when, no doubt, the future fate of the patient was sealed. There were no pericardial adhesions, but the right pleural cavity contained 3 pints of serous fluid. The aortic lesion impeded in a measure the escape of blood from, and allowed its regurgitation into, the left ventricle.

An ultimately fatal issue in this case was doubtless inevitable, for a *cor bovinum* is itself an impediment to circulation, and even with a like lesion all hearts have not equally the capacity for becoming unwieldy cardiac Sandows, but it very well illustrated, nevertheless, the beneficial influence of a bold use of the digitalis group in such cases.

As another case, showing the value of pushing the attack with redoubled energy upon disordered cardiac action with increasing dilatation, when the means used appear to have little effect, I may mention the case of a man, æt. 29, the subject of mitral constriction disease. His compensated heart had given way, the organ was much dilated and violently arhythmical in action. Instead of abandoning the digitalis he was taking, I doubled the dose, giving him 15 minims of the tincture every six hours. The patient lived for several years afterwards under treatment from time to time, and ultimately died in the country, whither I went to examine his heart, post-mortem, having been informed of his death by his relatives. When considering the treatment of the mechanical factor in heart disease, I shall refer more fully to the influence of valvular lesion as a guide in treatment.

The muscular system, which may be said to occupy a position midway between the involuntary and voluntary system, is the muscular mechanism of respiration. In relation to the treatment of heart disease, an efficient or supported state of the thoracic and abdominal muscles is of much importance. The value of the aid afforded the circulation by these muscles is well seen, when from acute or chronic disablement of them their function is abrogated or materially impaired. In those tragic cases of diphtheritic paralysis of the diaphragm, which so frequently have a fatal issue, we may find at early stages and for a short time that the heart's action is good, even when the respiratory muscles have become considerably involved. But this cannot continue long before the heart shows fatigue. On the other hand, with complete immobility of the intercostal muscles from ankylosis of the vertebro-costal joints, a freely playing diaphragm and abdominal wall may maintain the circulation in a condition of very fair efficiency. It may, moreover, be observed that a recurrent ascites, due to valvular disease of the heart, may only cease to recur when, in addition to paracentesis, the flaccid abdominal walls are maintained in position after that operation, by tightly bandaging the abdomen with broad strips of adherent plaster. This limitation of the abdominal cavity and support of the abdominal muscles also appears to increase the range of thoracic respiration, and helps to remove passively congested states of the lung, and to promote more vigorous systole of the heart.

Coming to the voluntary muscular system, the value of their exercise by natural progression, or the employment of graduated and systematic movements, is now well known, and is fully utilised as an important part of what has come to be known as the Nauheim system, a portion of our subject which I shall consider more fully in the next lecture.

THE EARLY DIAGNOSIS OF PULMONARY TUBERCULOSIS.[1]

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GENTLEMEN,—I am sure that you will agree with me that anyone who undertakes to give a lecture upon the early diagnosis of pulmonary tuberculosis takes upon himself a great responsibility. For of all the questions which the physician has to face, this is certainly one of the most important, and I question whether it is not *the* most important. First of all, it is a problem with which you will be confronted nearly every day in your practice; for I only have to remind you that, according to the Registrar-General's returns, at least one-tenth of the total mortality in this country is due to pulmonary tuberculosis. Secondly, the early diagnosis of this disease is often attended with extreme difficulty. One requires a very short experience in an out-patient department such as we have in connection with this hospital, to fully appreciate this difficulty. Nearly every day we have many patients coming to consult us, who complain of cough or other symptoms, where, on examination of the chest, it seems almost impossible to give a definite opinion one way or the other. It is only by following certain definite rules, and by evading certain pitfalls, that we are enabled to avoid committing very frequent mistakes. And lastly, our responsibility regarding the early diagnosis of this disease has been much increased by the progress which has been made during the last few years in the therapeutic measures which we have at our disposal. For whatever opinion you may have formed of what is called the "open-air" treatment of pulmonary tuberculosis, one thing is absolutely beyond all doubt, and that is, that if you are going to do any substantial good, you must put your patient under treatment during the very early stages of the disease. If you will turn to the results claimed by Brehmer of Göbersdorf, you will find that, out of over 5000 cases, there was a cure in 27·8 per cent. of those in the first stage of the disease, of only 6·8 per cent. in the second stage, and of only 0·8 per cent. in the third stage.

This afternoon we will only deal with the common variety of the disease—that is, the chronic or fibro-caseous form. We will not touch upon the miliary, the caseous, or the fibroid forms, as they are much less common.

Now, at the outset of my remarks, I should like to offer you a word of warning. Since Koch's great discovery we have had at our disposal a most valuable aid to the diagnosis of this disease. Of course, I refer to the detection of tubercle bacilli in the sputum. But this advantage has attached to it the great danger of our coming to rely too entirely upon the result of the examination of the sputum, and consequently of neglecting a thorough inquiry into the symptomatology, and, what is more important still, of the careful examination of the chest for early physical signs. We should guard against this danger most carefully; for there are many cases where a negative result is obtained on repeated examinations of the expectoration, and yet there is no doubt whatever that the patient is suffering from this dreadful disease. When I was at the Brompton and City of London Hospitals for Diseases of the Chest, it was my duty to examine the sputa of all the patients in the wards, and I was very much struck with the fact that, in by no means a small proportion, a positive diagnosis of early pulmonary tuberculosis could be made several weeks and occasionally even several months before tubercle bacilli were found in the sputum. This is, in reality, not so surprising as it would at first appear, because the absence of tubercle bacilli only proves that at the time no destruction of a tuberculous focus is taking place. I need not remind you of the method of examination; but you will permit me to recall to your memory that it is best to examine the morning sputum, and also to pick out the small purulent masses. If tubercle bacilli are present in the expectoration, it does not matter what symptoms or what physical signs may be present, we should, without hesitation, give a positive diagnosis of early pulmonary tuberculosis, as long as we can make certain that we are not dealing with a case of primary tuberculosis of the mouth, pharynx, or larynx. On the other hand, the sputum should be systematically examined in every patient who suffers from a cough. You will frequently get new light thrown upon many cases of "winter cough," especially in old people, which you have been regarding as due only to chronic bronchitis.

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[1] A Clinical Lecture delivered at the Mount Vernon Hospital for Diseases of the Chest, July 1904.

Now, what symptoms does a patient with early pulmonary tuberculosis complain of? He may notice nothing wrong with himself whatsoever. For example, only last week, a boy, whom I will afterwards show you, was brought to the out-patient department because he had been rejected by an insurance company on medical grounds. The father states definitely that the boy had never complained of a cough in his life; and yet, on examination, one finds unmistakable signs of a healed tuberculous lesion at the apex of the right lung. In a case like this, there may have been no symptoms at all, or, if any symptoms were present, they may have been put down to some temporary indisposition. A diagnosis is only made accidentally on physical examination. The commonest mode of onset is that of a "neglected cold," or an attack of what patients call "influenza." The latter should always arouse suspicion, for the general public very frequently apply this term to any recurring attacks of fever, whatever its cause may be. We should always inquire whether any of the characteristic symptoms of influenza were present. When the onset is insidious, for example when a patient comes complaining of such symptoms as anæmia, dyspepsia, or weakness, we should invariably satisfy ourselves regarding two points—(1) Is there any pyrexia, and (2) is the patient steadily losing weight? The temperature should be taken three times a day for some considerable time. If we find a continuous elevation of temperature, or a steady loss of weight, in the absence of other discoverable causes, such as tuberculosis of the lymphatic glands of the abdomen, the case is extremely suspicious, even though we can detect no physical signs on our first examination. The first symptoms may be those of pleurisy, either of the dry or serous form. The cough persists, and the patient becomes feverish, and gradually signs of the disease appear at one apex.

There are only two other modes of onset I should like to dwell upon.

First, there may be a history of repeated attacks of bronchial catarrh. Chronic bronchitis is set up, and emphysema supervenes. We often find in these cases that the cough, which had previously disappeared in the summer, remains, and the other symptoms are observed the following winter. These cases are frequently overlooked, especially as the physical signs are not very apparent, on account of the emphysema. As I have already said, the examination of the sputum is of great value here.

Secondly, there may be a history of hæmoptysis. Hæmoptysis is a very common mode of onset, but I do not think it is as common as is supposed. I do not mean that a very large percentage of patients do not come complaining of spitting of blood as a first symptom; but on close inquiry you will find that a large proportion of them had suffered from other symptoms for some time before the blood-spitting occurred. The attack may be immediately followed by the ordinary symptoms and signs of the disease. On the other hand, the patient may quickly recover, and no definite physical signs are detectable. These are important cases, and should be carefully gone into. We should first of all make sure that we are dealing with hæmoptysis, and not with hæmatemesis. The previous history will help us. If there is a history of gastric trouble, we suspect hæmatemesis. If, on the other hand, there is no such history, but the patient has suffered from cough or other pulmonary symptoms, we suspect hæmoptysis. If the blood is brought up without the act of coughing or vomiting, or if it is definitely coughed up, we can exclude hæmatemesis. We can in the same way exclude hæmoptysis if the blood is vomited up, as long as we are sure that it has not been previously swallowed and then vomited, which is apt to occur in children. If the blood is intimately mixed with air, bright red in colour, and alkaline in reaction, we are dealing with a case of hæmoptysis. The subsequent history should always be inquired into, for in a case of true hæmoptysis, if the cough persists, the sputum is almost invariably tinged or contains small clots for some days afterwards.

Having excluded hæmatemesis, our next duty is to find out the cause of hæmoptysis. First of all, make sure that the blood does not come from the nose, the mouth, the pharynx, or the larynx.

Enlargement of the thyroid pressing on the trachea, causing local congestion and catarrh, usually gives rise to cough and the expectoration of scanty mucus tinged with blood. In a case like this, we may be further thrown off our guard by the fact that, if the enlargement has lasted for some time, emphysema of the lungs may be set up. Aneurysm of the aorta pressing on the trachea or bronchus may cause recurrent hæmoptysis. Blood conditions and vicarious menstruation are rarer causes. Heart disease, and especially mitral stenosis, are comparatively common causes. We have now only lung conditions remaining, and you must remember that there are many other pulmonary diseases besides tuberculosis which are causes of hæmoptysis, such as malignant disease and bronchiectasis. One of the most important is bronchitis with associated emphysema: during a paroxysm of severe coughing, we may easily get a rupture of capillaries and the consequent bringing up of a little blood.

In any of the conditions I have named, we may have inhalation of a small quantity of blood, and, as a result of this, there may be localised crepitant râles heard, though they are not *persistent*—which is the important point, as we shall see when we come to speak of physical signs. But having made sure that there are no evidences of the above causes of hæmoptysis, and there are suspicious symptoms or physical signs, we should certainly give a positive diagnosis of pulmonary tuberculosis. We can even go further, and say that even when there are no suspicious symptoms or physical signs, a very large majority are due to a tuberculous lesion in the lung, if not all. The lesion may heal completely, and the patient never know that his lungs were affected; but, on the other hand, the hæmoptysis may recur if no treatment is adopted, and I believe that if the patient can afford it, the wisest plan is to put him under proper treatment.

We will now pass from the symptomatology of the disease to the physical signs, for it is on the early detection of physical signs that our diagnosis will mainly rest. The best plan to adopt for examination is the usual one of inspection, palpation, percussion, and auscultation.

May I first of all remind you of the common sites of tuberculous lesions? For, as Fowler has so ably worked out, we have a characteristic "line of march." In the great majority of cases, the primary seat is from 1 in. to 1½ in. below the summit of the lung, rather nearer the posterior and external borders. The lesion tends to spread in the first instance backwards. From this primary focus, the lesion often spreads downwards along the anterior aspect of the upper lobe about ¾ in. within its margin. A less usual primary site is the second and third spaces below the outer third of the clavicle, and the line of extension here is usually downwards along the outer part of the upper lobe. The *lower* lobe of the same lung is usually affected at a very early period—as a rule, before the apex of the opposite lung, and often long before there is any extensive lesion of the upper lobe. Its site is from 1 in. to 1½ in. below the summit, *that is opposite the fifth dorsal spine*, midway between the spinous processes and the border of the scapula. Now this affection of the apex of the lower lobe in the early stage of the disease is an immense help in diagnosis. For the existence of a lesion here, together with physical signs at the apex of the upper lobe, even though the latter in themselves are of doubtful import, is almost positive proof of tuberculosis. I will not go further into the "line of march" of the disease, but from what I have already said you will understand how extremely important it is for us to make a thorough examination of the supra- and infra-clavicular regions, of the supra-spinous fossa, and of the interscapular region opposite the fifth dorsal spine.

On inspection, we should first stand in front of the patient. One clavicle may be seen to stand out more prominently than the other. We can estimate the relative expansion of the apices by putting the thumbs on the second ribs below the clavicles, and fixing the eyes on the thumbs when the patient takes a long breath. Another way is to stand behind the patient and to look over the shoulders. If the area of infiltrated lung is of some extent, the expansion of the upper part of the chest is diminished. It can be further elicited by placing the hands below the clavicles, and asking the patient to take a long breath; or by standing behind the patient and placing the thumbs in the supra-clavicular and the fingers in the infra-clavicular regions. This diminution of expansion is of great significance, and is often seen before any alteration in the percussion note is obtained.

The *vocal fremitus* is of great importance also. It is normally more distinct beneath the right clavicle than below the left. If the vocal fremitus is equal on both sides, and well marked, there is probably some disease of the left upper lobe. If it is more marked on the left side, the probability is still greater. If, on the other hand, the fremitus is equal on both sides, but less marked than normal, it probably means some diminution at the right apex; and you should be on the look-out for this, because it means either a thickened pleura at the apex, or, what is more frequent, some localised emphysema. This localised emphysema is most frequently due to a deeper tuberculous lesion. The vocal fremitus is also normally greater in the right supra-spinous fossa than in the left, and any changes in this respect have the same significance as they have anteriorly.

When we come to *percussion* we have to deal with a much more difficult matter. But there are several general rules which we should always observe. First of all, percuss from the wrist. When we are percussing the apices, the patient should, if possible, be standing before us, and we should *carefully compare the two sides;* and a point of the utmost importance is to *percuss exactly corresponding points on either side.* Numerous serious mistakes are made by neglecting this very simple rule. Also employ exactly the same percussive force on both sides. In percussing behind, the patient should let the shoulders "drop," so as to relax the scapular muscles. In doubtful cases, great help is often obtained by percussing after the patient has taken a deep breath, for the diminished entry of air into the affected part may thus be made out. It is important to note the degree of resistance to the finger as well as the alteration in tone. It is well to begin with very light percussion, and afterwards to employ greater percussive force, and to compare the results. When we come to the supra-spinous fossa, firm percussion is required, on account of the thickness of the muscles there.

Normally, the note in the right supra- and infra-clavicular regions is louder than on the left side, unless the muscles are unequally developed on the two sides. In early pulmonary tuberculosis there is frequently diminished resonance. The note becomes higher pitched, shorter, sharper, lacks the normal tone, and there is a sense of increased resistance to the finger. This means that there is incomplete consolidation. The impairment may be more marked with light than with deep percussion. This suggests a thickened pleura. If it is more marked with deep percussion, we are probably dealing with a deep-seated consolidation. On the other hand, if the results of the two kinds of percussion are the same, we may assume that there is a deeply seated patch of scattered grey tubercles.

When we are dealing with a fibrous scar, with compensatory emphysema in the neighbourhood, the note on the affected side may not only be as resonant as that of the other side, but it may even be hyper-resonant. We may find marked dulness when there is little or no change in the breath or voice sounds. It may mean a greatly thickened pleura or deeply seated consolidation. As the tuberculous process usually spreads backwards in the first instance, we can often elicit a dull note posteriorly when the front of the chest is doubtful.

Will you allow me to offer you another word of warning? I have several times seen a positive diagnosis of pulmonary tuberculosis given from the mere fact that there was a difference in the notes of the two sides, though there were no other physical signs, and there was no pulmonary lesion at all. You must remember that even a marked difference in note may be present when the two sides are not perfectly symmetrical. We should most carefully examine for the presence of scoliosis, for this condition influences the position of the ribs and the shape of the chest. It is not enough to inquire about the spinous processes. We should note whether the upper ribs are more curved on the one side and flattened on the other, and look for other signs of scoliosis. Even a very slight deviation of the vertebral column from the normal is sufficient to cause a difference in the heights of the two supra-clavicular regions and the two supra-spinal regions, one side being more rounded than the other. The percussion in this more convex side is less resonant. The breath-sounds may also be diminished in loudness.

If we follow certain rules, we get incalculable help from *auscultation.*

Will you forgive me for reminding you that we may get three types of breathing in any healthy chest. There is, first, vesicular breathing. Here, the inspiration is soft and rustling in character; there is no appreciable pause between inspiration and expiration: the expiration is of a rather lower pitch, *faintly* blowing, and of shorter duration than inspiration. Secondly, there is bronchial or tracheal breathing, which is normally heard over the seventh cervical spine, and this locality should always be taken as the standard for comparing other sounds. Here the inspiration is blowing in character; the pitch is higher than in vesicular; there is a distinct interval between inspiration and expiration: the expiration is still more blowing, has a still higher pitch, and has an equal or longer duration than inspiration. And, thirdly, there is broncho-vesicular breathing, which is normally heard over the manubrium in front, and the upper part of the interscapular region behind. It combines the characters of vesicular and bronchial—that is, the vesicular quality of the inspiratory and expiratory sounds is diminished but not absent, the blowing quality is more or less marked according to the degree of consolidation, while the pitch is raised in proportion as the bronchial quality predominates over the vesicular. In auscultation, *the expiratory part should always be taken as the criterion.* It is of far greater importance in helping us to distinguish whether breathing is truly bronchial or not. In true bronchial breathing the expiration should be blowing, and have a uniform pitch and intensity through the whole act. Now, even in normal conditions, the *intensity* of vesicular breathing shows a very great range of variation. In one chest it is very loud, in another it is quite faint. This constitutes one of the commonest sources of error.

It can easily be avoided by comparing one side with the other. It is the difference between corresponding parts that constitutes the abnormal.

Any change in the *quality* of the breath-sounds is quite a different matter. But we must remember that normally the breath-sounds on the right side are of a slightly higher pitch, and the expiration is rather prolonged. Beneath the right clavicle they may be even bronchial. This is one of the commonest mistakes made by an inexperienced auscultator. A vomica is frequently diagnosed when there is no lesion at all. It is only of value when there are other corroborating signs.

There is another source of error we should always exclude. Nervous persons, especially women, when asked to take a long breath, sometimes produce a forcible movement of the chest. They close the glottis at the same time, however, and therefore no air can enter the lungs, and consequently the breath-sounds are inaudible. It can easily be distinguished, because the condition is bilateral, and it disappears on coughing. Or the reverse condition is sometimes observed, that is, the patient, when asked to breathe, narrows the glottis, and the breathing becomes bronchial. Having excluded these possibilities of error, when we come to early pulmonary tuberculosis, there is a considerable variation in the character of the breath-sounds.

Harsh, wavy breath-sounds, with prolonged expiration, precede the stage of feeble breathing. The wavy character is of no great significance, as it occurs in many other conditions. Regarding the prolonged expiration, what we infer from it depends entirely on its character. For example, if it is faintly blowing and of low pitch, it probably means emphysema. If it is truly bronchial or tubular in character, and of high pitch, it usually indicates consolidation.

A marked diminution of the respiratory sound at one apex, especially the right—where it is normally rather louder—if persistent on repeated examination, is extremely suspicious. It usually indicates a later stage of the disease than harsh breathing. We frequently find the breath-sounds in the second and third spaces are harsh when those above and below the clavicle are feeble. Furthermore, the breathing of the opposite upper lobe may be harsh, owing to the increased functional activity, and unless we are careful it is easy to make an error in diagnosis regarding the site of the lesion, because we may overlook the feeble breath-sounds of the side primarily affected.

As the affected area becomes more densely infiltrated, the breath-sounds become truly bronchial. The hearing of well-marked bronchial breathing over the chest wall implies that the superficial area of the lung is sufficiently consolidated to conduct the sound from the point it normally reaches in the tubes to the surface. Very superficial consolidation, which does not reach so far as the deeper layer of the lung, cannot carry forward the tracheal sound. Consolidation of the deeper part of the superficial layer, not extending to the surface, may carry the vibrations so far forwards as to convey a faint or distant bronchial sound.

Accompaniments.—As a rule, accompaniments are absent at the earliest period. The first that are heard are small crackling râles. They are chiefly heard during inspiration, and may be confined to that part of the breath-sound. A single râle, or perhaps three or four râles, may possibly be all that we hear. They are sharply defined crackling sounds, suggesting the explosion of a minute shell. It may be difficult to distinguish them from friction sound where the latter is of a crepitant character. If on quick breathing the sound is heard from the very beginning of inspiration, râles can be excluded. A rubbing friction sound in the neighbourhood is also of great value.

At a later period we get sounds of a clicking character, which are very like crackling râles but are more "sticky." They are generally supposed to indicate the commencement of softening in a tuberculous deposit. They are diagnostic of tuberculosis. When softening has occurred, the râles become more numerous, larger, and more liquid—that is, we hear medium-sized and large crackling râles. You will naturally ask whether these crackling râles, either the fine or medium or large ones, when heard at the apex, are pathognomonic of pulmonary tuberculosis. *Not necessarily.* For example, suppose you ask a patient, who is accustomed to shallow breathing, to take a long breath. What may happen is this: a localised area of air vesicles at the apex, which were hitherto collapsed, become suddenly distended, with the result that crackling sounds are produced. Or suppose a patient has emphysema: the same phenomena may take place, and the same sounds be heard. Does this fact entirely do away with the value of these accompaniments from a diagnostic point of view? Certainly not. For we can easily ascertain their significance. It all depends on whether the râles are *persistent*, and what we mean by being persistent is *whether they remain when the patient coughs or takes a long breath.* This is the fundamental inquiry to make in every case, and if we get persistent and strictly localised râles in the upper part of the chest, we can be practically certain that the patient is suffering from early pulmonary tuberculosis. Only one more point about these crackling sounds: sometimes when a patient swallows after coughing, we may get crackling noises produced, and these may be mistaken. We can easily diagnose their nature by telling the patient not to swallow after coughing.

Regarding the vocal resonance, it is increased in early pulmonary tuberculosis, and bronchophony may be present, and has the same significance as bronchial breathing.

We have now finished the physical signs of early pulmonary tuberculosis, and before concluding I should like to mention one point which is the crux of the whole matter. It is this: *Never make a diagnosis of pulmonary tuberculosis from one single physical sign.* This should be your guiding star. You should weigh the results obtained on inspection and palpation along with those derived from percussion and auscultation, and they should agree. On the contrary, certain signs when they are separately considered may not be of great value, but when they are in harmony we need have no hesitation in giving a positive opinion. I could quote to you a large number of cases, taken from my out-patient department week by week, which illustrates this point, so I trust you will always bear it in mind.

There are two remaining means of diagnosis at our disposal, namely, the Röntgen rays and the tuberculin test; but as I do not think they throw any additional light on the subject of our study, we will not discuss them.

SANITARY LAWS AND CUSTOMS IN THE EAST, SPECIALLY AMONG JEWS AND MOHAMMEDANS.

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Hygiene is not a modern science. The name itself recalls the times when the daughter of Æsculapius, goddess of health, was worshipped by Greeks and Romans. Still more ancient were the sanitary laws of the Egyptians, whose history can be traced back to more than 5000 years before the Christian era. The wonderful system of sewerage which was recently discovered in Crete—dating some 3000 years B.C.—and which for perfection of design and execution seems to be unsurpassed by the most advanced science of our times,[1] the Levitical Code of the Jews, the treatise of Hippocrates on "Air, Water, and Locality," the important place which the "Preservation of Health" occupies in the writings of Avicenna,—all show the great weight which the most ancient physicians attached to the laws of sanitation. The *mens sana in corpore sano* of the Romans is expressed substantially in the Arab saying, "Health is a crown on the heads of the hale which no one sees but the sick."

The ravages of death during the Middle Ages, which were chiefly due to insanitary habits and habitations, were a terrible lesson to the world; but it is only since the times of Hufeland that that lesson was taken to heart, and the value of hygenic laws again recognised. Slowly at first, more rapidly later on, the principles of this science have been reconstructed, and their application to the needs of the person, the family, and the public clearly pointed out and adopted by the most civilised nations. The result has been the utter extinction of leprosy—the most terrible of all diseases—in the United Kingdom and almost every other of the European states, the virtual extermination of plague, cholera, typhus, and smallpox, and a noted fall in the public death-rate. And it remains to be seen how far the recent discoveries, and the patient research now carried on as to the parasitic origin of disease, may lead to the prevention of much suffering and early death.

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[1] *Brit. Med. Journ.*, London, 1903, September 12.

Physicians and midwives.—The earliest notice of physicians in history is what we find among the ancient Egyptians, one of whose kings wrote a treatise on Anatomy. They were all of the more highly educated order of priests who lived in the temples, and each of whom confined himself to the study and treatment of some special class of diseases. The Hebrews during their bondage in that country learned and borrowed many things from their masters, and physicians and medicines are frequently mentioned in both the Old and New Testaments. In the Talmud it is enjoined that physicians be treated with much respect, and their fees to be always paid, and it forbids every Jew from residing in any town where there is no physician. Under the Abbaside dynasty in Bagdad the works of Aristotle, Hippocrates, and Galen were translated into Arabic, and the study of philosophy and medicine was eagerly pursued by Mohammedan and Christian students. They had hospitals in all large cities, to which were attached the most learned doctors of their time, and these doctors acted as censors of medical practitioners, and had a following of students who "read" with them, and to whom they gave certificates of qualification. There are still remains in Damascus of a hospital for the insane, a home for sick and stray cats, and an asylum for lepers which is supposed to date from the times of Naaman the Syrian (1 Kings v.). The most distinguished Arabian physician is the well-known Avicenna, who lived in the early part of the eleventh century (A.D.), and whose great work "El-Kanoon" ("Canon or Institutes") was printed from the Arabic text in Rome, A.D. 1593. But it had been translated into Latin from a MS. in 1498, passed through several editions, and was for a long time the standard authority on medical science. It is a complete thesaurus of all that was known of medical lore up to the times of the author. Another eminent name among the Arabs was Er-Razy, who first wrote on measles and smallpox. In the Middle Ages the most highly reputed schools of medicine were those of the Moors in Spain, to which many students of the neighbouring Christian countries resorted.

There are now five medical schools in Turkey and Egypt which have been founded on modern lines, and in which the course of study, after a preliminary examination, extends over four years.

All foreign diplomas are recognised by the Imperial Medical School in Constantinople, after a short "colloquium" with the candidate to satisfy the board of examiners as to the identity of the person who presents his academic certificate, and no medical man or dentist is allowed to practise in Turkey without having a deed of registration. A few of the graduates of the native schools supplement their education by some further study in a foreign university, where they might obtain better advantages for dissection, midwifery, and clinical instruction under celebrated teachers.

The two schools of midwifery in Constantinople and Cairo are of a late date, and the instruction given in them is very elementary, and limited to the management of ordinary cases of natural labour and some knowledge of the use of antiseptics. The women students, who alone attend these schools, have to pass an easy examination in reading, writing, and arithmetic, attend a few lectures, study a small text-book which in Egypt is translated from English and is an admirable thing of its kind, and assist at some maternity cases. The whole course for a simple certificated midwife takes about six months. The number of such graduates is still very small, and the work is almost wholly in the hands of the old midwives, who have been trained by other midwives and follow the traditional methods of olden times.

Birth—Mother and child.—All women in the East are delivered on the birth-stool, which is first noticed in history about fourteen centuries before the Christian era (Ex. i. 16). It is in the form of an arm-chair, and is made of solid wood with a circular opening in the seat, from which a wide slit extends to the front. The arms of the chair are used for support during pains, and the sitting posture is believed to favour the expulsive efforts of nature. Unless the woman is constitutionally weak, or flooding takes place, this position might be preferable to her lying on the left side. The midwife sits on a cushion in front of the stool with a sheet on her lap, and another to cover the lower part of the parturient woman. In the earlier stages of labour she is allowed to get up and walk about, but after the membranes rupture she is made to sit until the child is born, and is often encouraged to strain as the head presents. No attempt is generally made to support the perineum, which sometimes gets lacerated but soon granulates, leaving a soft pad, and the woman is none the worse for it. The duties of a midwife are thus so far very few, and though some of them may be officious and meddle too much, the wise ones leave matters to nature. After the child is born, a clean cloth is put to the vulva; no bandage is applied to the abdomen, the parts are not bathed until some hours afterwards, and a general bath is not given before a week after delivery. Cases of dangerous flooding or mortality are very rare, and the rapid recovery which follows is mostly due to the good formation of the pelvis in Eastern women, their sound constitution, and the vigorous contractions of the uterus. In breech presentations the case is left to nature; in other abnormal conditions a physician is generally called.

The child is received into the midwife's lap, and she waits until the placenta is expelled, and then cuts the cord with scissors about an inch or two from the body after tying it with a bundle of cotton thread. The wound is dressed with a little common salt and wrapped with a bit of soft clean cloth, and the body sprinkled with a little common salt, or is bathed with tepid or warm salt water and then swaddled. The feet are tied together, the arms are brought down to the thighs, and a cloth band is wound round the body and another round the head. This custom is very old (Ezra xvi. 4), and though it is irrational it neither impedes growth nor prevents the development of a fine physique so common among Eastern races. As the child, however, is always laid on its back and the head-band may be too tight, the occipital or some other cranial bone may be flattened, and the shape of the head malformed for life, but I have observed in such cases no injury to any of the mental faculties. Arabian authors recommend cleaning of the nostrils, dropping olive oil into the eyes, and gentle rubbing over the lower part of the abdomen and tickling the anus to induce micturition and defæcation. The child is soon put to the breast, and this may sometimes be useful to the mother in exciting uterine contractions in case of hæmorrhage or retention of clots.

The period of lactation is generally about two years, and the Talmud forbids a woman who loses her husband during that time to marry again before the child is twenty-four months old, and may be released from her fullest maternal care. If the menses appear before that time, the child continues to nurse from its mother, though Avicenna says that her milk is then vitiated, but not positively harmful. In case of pregnancy, continued nursing is considered highly injurious to the health of the child, the mother, and the fœtus, and the child is then weaned—if old enough—or given over to a wet-nurse or to the modern feeding-bottle. The nurse must be young, healthy, and good-tempered, and the child is not allowed to take the breast until violent emotions have well subsided. The age of education begins about the fifth year, and its religious part among the Jews takes about ten years.

It is generally well known that in the East sons are always preferred to daughters, and this can be easily explained by the fact that in feudal times the family and clan gained strength in their struggle against their enemies by the accession of fresh numbers to their force. The Psalmist alludes to this very pointedly when he says, "Happy is the man that hath his quiver full of them: they shall not be ashamed, when they speak with their enemies in the gate" (Ps. cxxvii. 5). Sons are also a great support to their parents in old age, on which the Koran has this fine passage: "Thou shalt be kind to thy parents, and when they become old and thou takest them in, thou shalt utter no word of impatience to them nor rebuke them, but thou shalt speak gently and be humble to them, and thus pray, 'My God, be gracious unto them even as they tended me when I was young'" (xvii. 25). In the case of daughters, the Talmud gives this unfavourable account of them:—they may go wrong when they grow up, or contract an unhappy marriage, or be sterile, or be divorced and have to return to their father's house. An Arab poet says, "When a man's daughters grow up they bind round his head a fillet of shame and infamy"; and the horrible customs of the ancient Arabians, in burying alive some of their daughters as soon as they were born, was abolished only when the religion of Mohammed became the law of the land.

Circumcision.—Circumcision is a very ancient custom, which can be traced back to times immemorial among the Egyptians, and it is quite certain that the Jews, Arabians, and other Eastern nations learned and adopted it from them. While it is an inviolable law to the Hebrews as a seal of the Covenant between God and Abraham and his descendants (Gen. xvii. 10), it was for sanitary objects that the habit has prevailed so long and so widely among the peoples of the East. Herodotus expressly says that the ancient Egyptians "are circumcised for the sake of cleanliness, thinking it better to be clean than handsome" (ii. 37). To the Hebrews the practice became the symbol of purity, and "the uncircumcised," and "the uncircumcised in heart," were the morally impure. The contest in the Apostolic Church about circumcision in relation to Gentile converts was decided by the Council of Jerusalem, which abolished this law from the new faith (Acts xv.). It was a universal custom of the ancient Arabians long before the times of Mohammed, and he retained it in the new religion which he taught, though it is not once mentioned in the Koran. I believe it is also practised by the Christian Copts and Abyssinians of our day.

I have not been able to find out at what age this operation was performed by the ancient Egyptians, but the Jews do it on the eighth day, while the Mohammedans leave it to the convenience of the parents at any time between the fifth and twelfth year. If it be of any use, or is to be done at all, the Jewish earlier date of infancy is probably much preferable. The operation is always performed by a practised or professional man, and in the following manner: the prepuce is drawn forward and cut with a sharp knife or razor, and what remains of it is everted behind the neck, and soon shrivels and disappears. The wound is dressed with some antiseptic powder, no sutures are applied or needed, though the bleeding from the dorsal vessels is sometimes troublesome, and the healing process is generally rapid.

As to the sanitary aspects of circumcision, there can be no question of its utility when the prepuce is abnormally long, or when its orifice is too small to allow a free current of urine; and in every case its excision prevents the accumulation of the sebaceous secretion from the small glands surrounding the corona, which, if retained, is offensive, and may be the cause of irritation, leading perhaps to nocturnal incontinence of urine, and possibly to evil habits. But the chief hygienic benefits of circumcision are that there can be no such thing as phimosis or paraphimosis, and that as the prepuce is often the seat of chancre, the danger of syphilitic infection is considerably lessened. Moreover, when the glans and its neck are deprived of what appears to be a useless covering, and may be, like the appendix, a vestige from a former stage, the epidermis becomes somewhat hardened by exposure, and abrasion and inoculation are less likely to take place. This view receives a considerable support from the clinical fact that we in the East see more cases of this disease among the uncircumcised than among the circumcised. It thus becomes an open and a serious question in modern hygiene, whether this custom, so ancient and so widely prevalent among Oriental peoples—far from being a barbarous mutilation—has not been of great benefit to them, and whether it may not now be generally adopted in Europe, as it has been, I believe, to some initial extent, in the United States.

Marriage.—The forbidden degrees of consanguinity in marriage as defined in the Jewish Code (Lev. xviii. 6–18) are still held in force by Jews, Christians, and Mohammedans. Marriage with the sister of a deceased wife is not included in that prohibitive list, and the Talmud highly commends it on the ground that it is conducive to domestic happiness, and chiefly to the welfare of children born from the previous marriage. But marriage with a niece or cousin is not encouraged by the Jews, because it is believed to be the cause of unhealthy offspring. Among Mohammedans, cousin-marriages are very frequent, and a man speaking of his wife generally calls her his cousin. The Greek Church goes far beyond the Levitical Code, and rigidly forbids all marriage within what is called the seventh degree—a very remote cousinship—and for which they plead not only sanity of progeny, but also the drawing of distant families into a close bond of kin, aid and friendship.

Both Jews and Mohammedans insist on early marriages, and the Talmud makes it a positive law that the age shall not exceed the eighteenth year for males and females, but it is a law which is often violated, though marriage in the East is very general during the earlier years of manhood. These early marriages are believed to save the young of both sexes from vicious habits, and conduce to health and fecundity; but their morality is low—specially among men—and their birth-rate is not so high as in Christian populations. Polygamy and divorce are not very common, and the restrictions which the Koran and the Talmud have laid down are not easy to put aside. The Jewish Rabbis allow divorce only in very exceptional circumstances, such as insanity of the wife, serious bodily grievance, and intolerable incompatibility of temper; and they permit an additional wife only in hopeless sterility, and when the husband is unwilling to divorce his mate. A woman is unclean to her husband, who may not even simply touch her, during the menstrual period, and for a week afterwards. Disregard of this law is not only unnatural and unclean, but is believed to be injurious alike to husband and wife, and highly pernicious to the ovum, if fecundation should then take place, and to the infant afterwards.

Cases of epilepsy, mania, and imbecility are quite common among the feudal families of the Lebanon, whose range of marriage by law and custom has been very limited for many generations; and there can be no doubt that cousin-marriages, if long continued as it has been in those families, may be highly injurious to the offspring, both physically and mentally. Deformities and diseased conditions at birth are referred by Mohammedans to causes which God alone knows, and by some Jews to heredity or misconduct of parents. The Talmudists, who are firm believers in astrology, attribute them, and all those other mysterious and immense inequalities in life, which no human mind can explain, to astral influence—a belief which was quite general during the dark Middle Ages. But the majority of the Jews, who believe in the transmigration of souls, regard them as a punishment for sin committed in a previous stage of existence, and it is probably to this creed that an allusion is made in John ix. 2 as to the man who was born blind—whether *he*, or his parents, had sinned so that he was born in that condition. The Druses of the Lebanon, who hold the same faith, say that in no other way can God's justice and goodness be vindicated.

Food.—The Levitical law as to clean animals which may be eaten, and unclean which are forbidden, is still kept very rigidly by the Jews. The ancient Egyptians had something of the same kind, and the distinction was evidently made on hygienic grounds, prohibiting as food birds of prey and carnivorous beasts, whose meat is unwholesome, and animals whose habits are dirty, like the pig, or whose flesh was considered difficult of digestion, like the hare. The Koran forbids, as in the Hebrew Code, the meat of animals which die from disease, or have been strangled, beaten, gored, fallen from a height, or mauled by wild beasts. But the severest prohibition, in both religions, is that which relates to the flesh of swine. To both Jew and Mohammedan it is an utter abomination, not only because of the filthy food and habits of this animal—which are particularly so in the East—but also because the use of pork in warm climates is certainly unhealthy. It may also be the means of trichiniasis infection; and I have known that even wild boars, whose flesh is a great luxury, have communicated this disease to large numbers of people.[1] Blood as an article of food is also forbidden by both Jews and Moslems, because it is believed to be the abode of life (Gen. ix. 4) and unwholesome to health. Before cooking meat, the Jews macerate it in water for half an hour, and salt it so that it may be freed from all appearance of blood. The biblical commandment, "Thou shalt not seethe a kid in its mother's milk" (Ex. xxiii. 19) is interpreted by the Rabbis not only literally, but as including that no meat may be eaten with milk or any of its products, as butter or cheese, and they enjoin an interval of six hours between two such kinds of food. There appears to be no hygienic reason for this usage, and Maimonides, a celebrated Jewish rabbi, philosopher, and physician, who lived in the twelfth century, says that such a mixture was offered to idols, and hence the prohibition.

Animals are slaughtered for food in the East by drawing a knife across the throat, and dividing the carotid vessels, and the head kept in a dependent position until the animal dies from loss of blood, but it must be perfectly sharp, with no visible notch, so that it may give the least amount of pain; and in no case is wringing of the neck or strangling allowed. The name of God is always invoked by both Jews and Moslems before the animal is put to death. Among the Jews this is always done by a specially appointed expert, who then opens the carcass and examines all the viscera, of which, if any is diseased, the whole animal is rejected as unfit for food. If healthy, it is stamped in Hebrew characters as *kasher* (lawful), and no Jew will ever touch meat which is not thus stamped. Much stress is laid on the examination of the lungs, which must be blown and show no perforation. *Tænia* in the intestines does not render the carcass unhealthy, but hydatid cysts in any part of the body condemn it as *taref* (unlawful). It is probably to this great care in choosing healthy animals for food that tuberculosis is comparatively rare among the Jews in the East. The fat of the omentum and of the suprarenal capsules is well known to be difficult to digest, though the Jews forbid it on ritual grounds.

Cases of tuberculosis among the Jews in the East are comparatively rare. Whether this arises from the healthy meat of animals which they eat, and which may thus have an important bearing on the now disputed question of the transmission of the bacillus from animals to man, or from other causes, such as their living in separate quarters and less prone to infection, is not clear.

Their articles of food do not differ from those used in Europe, —bread, meat, fish, fowl and game, vegetables, fruit, milk, clarified butter, eggs, etc.,—the two first being considered the staple elements of life, though the use of much meat is not believed to be good, specially for the young and the aged. Young and fat animals are preferred to old, bread must be of the first quality, fruit ripe and in season, and vegetables fresh; and so on as to the other kinds of food, on which the Arabian physicians are very explicit. The poorer classes, however, live mostly on bread, fruit, fresh or dried, and vegetables stewed in oil; but the rich also use much oil in their food, and it appears to be, indeed, both wholesome and nutritious. One of Mohammed's traditional sayings is, "Eat oil with your food and anoint yourselves with it, for it comes from a blessed tree," and the Koran calls the olive tree "blessed" because of its great usefulness in domestic life. Its wood is very solid, its fruit a daily article of consumption by rich and poor, the oil expressed from the fruit is not only used for cooking purposes, but enters largely into the manufacture of soap, and until petroleum came into recent use it was the only agent for supplying their lamps at night. As a medicinal agent Avicenna highly recommends it as an external application in wounds, anthrax, malignant pustule, lupus, itch and nettle-rash, and internally as an emetic in cases of poisoning, and a cathartic in colic with abdominal tumour. As a liniment combined with massage—a word probably of Arabic origin—it is often used in muscular and neuralgic pains. Sir James Simpson thought highly of its value in the case of weakly infants in the form of a liniment to be gently rubbed over the whole body, and I think I have seen good results from its use in this way. The Talmud says that as an article of food it undoubtedly sharpens the mental faculties, and European Jews believe that their Eastern brethren excel them in shrewdness because so much of their diet is made up with oil.

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[1] *Lancet*, London, 1881, March 19.

Other hygienic rules as to food mentioned in Jewish and Mohammedan books, and which are generally known to the better class of people, are, that a little salt before meals excites the appetite and helps digestion, that no unpleasant subject should be brought up at table, that the morsels be small and well masticated, that the quantity be moderate, and the eater cease before full satiety, that breakfast precede the morning's work, that a light dinner is followed by pleasant sleep, that no food be allowed between meals, and that gluttony and errors in food are a fruitful source of disease, and proper diet of prime importance in its treatment. Attention to the excretions is rigidly enjoined, and much value is attached to good and regular habits. An Eastern saying is, "An old man should not give up an old habit, nor take to a new one." Among the insanitary customs are the Mohammedan Ramadan fast, which is kept for a whole month from early daybreak to sunset, and the long lents of Christians, which often lead to disorder or disease of the digestive organs.

Water.—In the warm and dry climes of the East, abundance of water is an essential element to life in all its forms, and most of its towns are built close to some river or stream. Other sources of supply are springs, wells, and cisterns, and preference is always given to the first because it is pure and less liable to contamination. The immense benefit of having a pure and sufficient quantity of water was well known to the ancient Romans, the remains of whose aqueducts are still to be seen throughout the whole of Syria, and is strikingly illustrated in the town of Beyrout, which since 1875 has been well supplied by an English company from the Dog river (the ancient Lycus), and has repeatedly escaped cholera when it was raging all around. With the exception of one remarkable and violent outbreak of typhoid fever in 1895, and for which there must have been an adequate reason,[1] epidemics of this disease are generally rare and mild. These advantages have been so clearly evident to the Syrians, that they will probably be soon induced to adopt similar measures in all their towns. The Nile is the only source of water-supply to all the people of Egypt. Coming from a great distance, it is muddy, and carries with it many impurities, and the better classes drink it only after having been filtered through large pottery jars, a method which, I believe, has been pronounced by Koch to be effectual in freeing it from disease germs; but the fellahin, who form the bulk of the population, use it as it is drawn directly from the river, and therefore most of them suffer from bilharzia. Dr. Harley supposed that this parasite enters, in some one of its stages, the urethra in bathing, but it is much more probable that its ingress is by the mouth. Another disease which is much more serious to life, and whose origin is evidently impure water, is dysentery, often leading to abscess of the liver.

Avicenna has a long and admirable chapter on water, in which he anticipates much that we have in modern books on hygiene. He mentions its different sources, its comparative qualities, the kind of soil through which it percolates, and the changes to which it is incident in its course. He insists on drinking water being clean, tasteless or odourless, condemns its use when stagnant, and recommends boiling in all suspicious cases. Ignorant of the chemical tests of our day, he distinguishes between "light and heavy" (soft and hard) water, not by the action of common soap, but by the following ingenious quantitative method: two bits of cotton are well saturated, one with a standard light water, the other with the sample for examination, dried, and then weighed in a delicate pair of scales, when the amount of solids in solution may be ascertained. He speaks highly of fresh rain-water, condemns all conveyance by leaden pipes as productive of bowel complaints, and attributes to the use of stagnant water—specially when uncovered—diseases of the liver, spleen, and bowels, which often lead to dropsy. He advises the internal use of very hot water in colic, constipation, epilepsy, melancholy, and other nervous diseases, by means of which the stomach and bowels are well cleared out, and says that turbid water may be the cause of stone and intestinal obstruction.

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[1] *Trans. Epidem. Soc. London*, vol. xv. p. 147.

As in eating, drinking must be slow—rather sipped than gulped—and it should not be too cold, nor taken on an empty stomach, or after violent exercise. The quantity at meals should be moderate, giving of the stomach one-third to solid food, another third to drink, and the remaining part to air. All vessels containing drinking water must be covered, and one of Mohammed's traditional sayings is, "If a fly fall into a drinking water-vessel, that vessel must be washed, for a fly carries disease in one of its wings"—a remarkable observation for that age, which is confirmed by what we now know of the agency of these noxious insects in carrying microbes of purulent ophthalmia, malignant pustule, typhoid fever, cholera, very probably of leprosy, and possibly of tuberculosis.

Alcoholic drinks.—The two native alcoholic beverages in the East are arrack, a spirit which is distilled from grapes or wine, and flavoured by anise-seed or mastic, and wines which are a ferment of grape juice and vary in quality and strength, but generally have a high percentage of alcohol owing to the abundance of sugar which the Syrian grapes contain. Wines, now made extensively after the French method, are much weaker, and brandy imported from France is preferred by drinkers to the native arrack, though the latter, when good, is a much purer product of distillation, and is generally drunk mixed with water. As among the ancient Greeks and Romans, wines are still generally diluted, and the Talmud gives the proportions as one of wine to two of water, which much lessens the chance of taking a large quantity of alcohol.

Wine, like gambling, is forbidden by the Koran as "an abomination of the Devil," and no pious Moslem will ever touch it. A curse is invoked on every one who drinks it, buys it, sells it, or even carries it. But it is in common use among the Jews, and their Rabbis even recommend it in moderate quantities after the fortieth year of age; one of their sayings being, "Old wine is good for old men." As to intoxication, they seem to differ, for while some condemn it as wrong, others condone it as a light thing, forbidding it only at the three times of daily prayer, which leaves the night alone free (1 Thess. v. 7). It is remarkable, however, that while it is prohibited in the forty-two commandments of the ancient Egyptians, from whom the Hebrews learned and borrowed much, it does not appear in the Decalogue, nor at all in the Pentateuch, and very rarely in other parts of the Old Testament. But drunkenness is not so general a vice in warm climates, nor so commonly pushed to the terrible extent which may be seen in Europe, specially in its more northerly parts, though the use of alcohol in some of its forms and the habits of intoxication are probably on the increase in the East. Arabian physicians caution against habitual and excessive drinking as leading to diseases of the liver, dropsy, apoplexy, and sudden death; and the Jewish Rabbis in assigning the age of 40—the epoch when man is sobered by time, the year of repentance with Moslems—as that in which alcohol may be safely taken in small quantities with food, evidently intend to discourage early habits of drinking and drunkenness, which are so ruinous and so difficult to eradicate later on in life.

Sleep.—Arabian physicians describe wakefulness and sleep as corresponding with, and very similar to, action and repose, and say that sleep overcomes all forms of fatigue, is useful in fluxes and hæmorrhages, and highly beneficial to old people. They recommend early hours and moderate periods—the Talmud specifying eight hours—and disapprove of indulgence in it on a full or an empty stomach, the best time being from three to four hours after the evening meal, when the "first digestion" (gastric) is completed. A common saying is, "If your dinner is light your sleep will be pleasant." They advise that the position of the sleeper be first on the right side and then on the left, as favouring digestion, while sleeping on the back may bring on incubus, brain trouble, and other undesirable things. For insomnia they recommend a warm bath before going to bed, with copious effusions on the head, and quote the personal example of Galen, who used to eat lettuce for that purpose, the dried juice of which (lactucarium) is still considered a hypnotic in our days. The old Oriental habit of lying in beds on the floor is fast giving way to the use of bedsteads.

The afternoon siesta so prevalent in the East and Southern Europe is wholesome and refreshing, specially to young children, and to the weak and old. But it must be short—the Talmud limiting it to sixty breathings (the "forty winks" of some), which, of course, must be taken with considerable latitude. In excess it is certainly harmful, leading to laziness and disordered digestion, and interfering with sound sleep at night. One of Mohammed's traditional sayings is, "Take your afternoon rest—it is the devils who take no rest."

Dress.—The old flowing, graceful robes of olden times are fast giving way to modern tight clothes, the exceptions being mostly Moslem sheikhs and Jewish rabbis. In inland places and among the Bedouins of the desert the old dress is still retained. From a sanitary point of view the turban is a good protection to the head from the sun, while the Bedouin head-dress covers both the forehead and the upper part of the spinal column. The modern fez is the badge of Turkish nationality, but is a very inadequate cover to the head. The girdle is an important part of the Oriental dress, and is believed to give considerable strength during muscular exertion and support to the abdomen, to which there are many allusions in the Bible. The old sandals and modern loose shoes without heels are comfortable and give no cause for corns and ingrowing nails, but are not so well adapted for rain and mud and snow. The shirt, which has to be so frequently changed, is an important part of dress, and it seems that the Crusaders learned its use from the Saracens and took the Arabic word *chemise* from them. What are called "the love-locks" of the Jews are still retained among many of them, not only in obedience to a biblical law, but as a badge of their nation; but their women are ordered by the Talmud to cut their hair and wear wigs, so that they may lose this feature of female beauty and lessen the dangers of Gentile admiration. This custom, which was enacted by the Rabbis of the Middle Ages, is now given up in Europe, but is still kept by the older Jewesses of the East. "A man," says the Talmud, "should be more lavish of expense on dress than on food."

Personal cleanliness.—The priests of the ancient Egyptians washed themselves in cold water twice every day and twice every night, and wore linen garments constantly fresh washed (Herod. ii. 37), and the laver of the Jews may still be seen in the great temple of Karnak in Thebes. Greek and Roman baths were public institutions often frequented, and so is the modern so-called Turkish bath, whose methods are most effectual in cleaning the skin of all its dried secretions, but whose sanitary effects, if too often repeated, is open to serious doubt. The daily cold bath is recommended, but not to infants or old people. After every form of excretion, washing the whole or certain parts of the body is a religious law to both Jews and Mohammedans, and no prayer is ever attempted unless the person is ceremonially clean. Particular attention is paid to washing of the feet (John xiii. 10). Before and after food the hands are always washed. After every stool the anus is thoroughly washed with cold water —a habit which I have observed to be the best preventive of piles, and their best treatment when inflamed. But ceremonial and personal cleanliness are not always the same thing, and the difference between Jews and Moslems in this respect is very great: for, while the former are notoriously filthy in their persons, garments, and habitations, the latter are equally noted for their scrupulous cleanliness, and the Arabic counterpart of the English proverb, "Cleanliness is next to godliness," is "Cleanliness is a part of godliness."

The following verses, from a mystic Persian poet (Jelaleddin), who lived in the thirteenth century, while strongly insisting on cleanliness of person and surroundings, aim at something much higher—a clean mind in a clean body:—

"Clean be kept thy Garment, and
Clean be kept thy Mouth and Hand.
Clean thy Garment from false Gawds,
Clean from all Earth's Filths thy Hand.

Clean thy Heart from earthly Spite ;
Clean thy Lips from Greed's Demands.
Outer Threshold ever clean,
Clean within let all Things stand.
House all clean, might entertain
Angel from the Heavenly Land.
Clean the Food, and clean the Cup,
Clean the Wall from smoking Brand.
Son ! Thy outward Cleanliness
Pledge of inward is, when scanned.
Clean let Hand and Mouth be kept ;
Clean thy Garment's every Strand."[1]

Habitations and sewerage.—When the site of a house is a matter of choice, the following points are recommended: that the ground be elevated, the soil hard and dry, all the apartments well exposed to the sun, and the air around pure and free from the noxious emanations of graves, shambles, marshes, ditches, and rank vegetation. Northern climes and mountain heights are believed to contribute much to health, strength, bravery, and beauty, while hot zones are enervating, and lead to premature old age. The houses are laid out very much according to the lessons learned from experience in obviating, as far as possible, the severity of both heat and cold, and their general plan is very similar to those which have been excavated in Pompei, and well adapted to warm latitudes. Of all laws which relate to social life, none, perhaps, is so useful as that in which Mohammed strongly insists on the rights of a neighbour to friendliness, consideration, and help; and the Arab proverb, "Seek a good neighbour before you take a house," well corresponds with the Scottish saying, "Nae man can live langer in peace than his neighbours like."

The methods of sewerage are still in a very imperfect condition, and probably inferior to what they were in ancient times. In towns on the seacoast the contents of water-closets are led by inclined conduits of masonry to the sea; and when this is impracticable, they are received into vaulted cesspools, which are cleaned out from time to time. No great care is taken in keeping the drains at a distance from drinking water, and the construction of the conduits is generally too imperfect to prevent offensive exhalations. Modern syphon-traps are now, however, being rapidly introduced, and are well appreciated as preventing evil smells, and contributing much to the sanitary condition of habitations.

Disposal of the dead.—It is an old Eastern custom to bury the corpse soon after death, and one of their sayings is, "To bury the dead is to honour them." Beside the hygienic point of view, in cases of death from some infectious disease, early burial may lessen the lamentation and grief, so demonstrative among Oriental nations, of the immediate relatives. But the chief reason may be the changes and decomposition which set in soon after death in hot climates, and are painful to see, and to which Abraham, in seeking from the children of Heth a place to bury Sarah, may have referred when he said, "that I may bury my dead out of my sight" (Gen. xxiii. 4).

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[1] "The Festival of Spring," xxiv., by the late Rev. Dr. W. Hastie, of Glasgow University.

But their methods of dealing with the dead body have changed much during the long roll of ages. The ancient Egyptians embalmed their dead, and that art was so skilfully executed that no decomposition was possible; and the features of Rameses II., who lived in the fourteenth century before our era, and whose body lies in the Cairo museum, are still natural and quite unmistakable. The Greeks and Romans preferred cremation on the funeral pyre, or burial in a tomb or grave. The Jews and Mohammedans always wash the corpse with water and soap, sometimes perfume it—a relic of the spices and perfume bottles of ancient times—cover it with a shroud, and carry it to the grave in a coffin or on a bier. There the body is so laid "that earth shall touch earth," and the Rabbi—when the deceased is a Jew—pronounces the biblical formula, "For dust thou art, and unto dust thou shalt return" (Gen. iii. 20). The grave is generally about 5 feet in depth, and slabs are inserted above the body, so that it may be protected from the covering earth. Wealthy Christians have now well-built family vaults, while a common tomb receives the poorer classes in the villages of the Lebanon. Of gravestones, Mohammed said, "the best are those which crumble soonest."

And so customs have varied as to the site of sepulture. The old Roman law, which ordained all cemeteries to be at some distance from towns and habitations, is still in force, but in course of time many of them have become intramural. The ancient Egyptians buried their dead in rock-hewn tombs on the hills which lie to the west of the Nile, the region of the setting sun, the land of Amenti, where departed souls go. Some of their kings were deposited in famous pyramids, and both these and the tombs of kings, queens, priests, and wealthy men are now as solid and perfect as they were from forty to sixty centuries ago, and even the tombs and deep graves of the common people are still safe from the ravages of time. They were, indeed, as they said, "eternal homes," while their abodes on earth were only "inns" for lodging passing travellers. The ancient Phœnicians and Hebrews followed their example as far as they could, and the hills near Sidon were the necropolis of that old city, and are still riddled with tombs, each of which contains a series of chambers with raised loculi, on which the dead were laid, so that the members of a family shall be together after death as they lived together in their earthly homes,—a mere sentiment, it may be, but one which strongly appeals to many a loving, sorrowing heart.

REVIEWS OF BRITISH AND FOREIGN LITERATURE.

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Lectures, chiefly Clinical and Practical, on Diseases of the Lungs and Heart. By JAMES ALEXANDER LINDSAY, M.D. London: Baillière, Tindall, & Cox.

THIS volume, consisting as it does of clinical lectures delivered during the past fifteen years in the Royal Victoria Hospital, Belfast, may be heartily commended. It seems to us peculiarly adapted to the requirements of the senior student, and we are assured that no man engaged in ward work could do better than possess himself of and digest the contents of this manual. In saying this, we are far from suggesting that the book is merely a students' manual (though to produce a good students' hand-book is no light or unworthy task); on the contrary, it is a book which all practitioners may read with pleasure and profit. As is but natural in a series of clinical lectures, the writer is wholesomely dogmatic, rather than reservedly judicial in tone; but if the reader should differ, he will seldom do so without admitting that his author's opinion is devoid of all faddism, and based on a common-sense view of his subject. The first four chapters deal with the general principles of diagnosis, and with the physical examination of the lungs. Those dealing with diagnostic methods, and the interpretation of history in disease, are most suggestive, and will certainly be found helpful. The chapters on physical examination naturally challenge comparison with the numerous manuals which already exist; and in these it seems to us that the writer rather errs on the side of complicating the subject by over minute subdivisions of auscultatory phenomena and percussion sounds; while, on the other hand, he does not sufficiently emphasize the importance of palpation—a method students are already, as a rule, all too prone to neglect. Pleurisy and pulmonary phthisis are dealt with with a fulness commensurate with their importance, the questions of the early diagnosis of phthisis and its treatment being especially well done. A little more attention might with advantage have been bestowed on malignant disease of the lungs, which is really not so rare as might be inferred from Dr. Lindsay's experience. The concluding chapter of the section on pulmonary diseases takes up the treatment of pneumonia and asthma, and in it the author shows himself a sane and trustworthy guide; in fact, throughout the book the definiteness and simplicity with which rules for treatment are laid down is a commendable feature. The second half of the book is devoted to diseases of the heart, and is less systematic than the first half. Cardiac symptoms are clearly discussed with a fulness which their importance merits, and in another chapter a number of the ordinary difficulties which arise in the interpretation of combinations of murmurs, etc., are mentioned, and the lines of their solution indicated. We note that in the treatment of heart disease the writer expresses a strong preference for digitalis leaf over the other preparations of the drug.

Pediatrics: The Hygienic and Medical Treatment of Children. By THOMAS MORGAN ROTCH, M.D., Professor of Pediatrics, Harvard University. Fourth Edition. Philadelphia and London: J. B. Lippincott Co.

WHEN a book has received the recognition accorded to Rotch's Pediatrics, it is not a matter for surprise that there is a repeated demand for fresh editions of the work.

Dr. Rotch has gained a world-wide reputation as the pioneer of laboratory or percentage feeding, and he has raised the subject of infant feeding from the somewhat empirical and unreliable position which it previously occupied, to the more satisfactory platform which it now occupies. There can be no question of the high scientific value of this portion of the book, but the author's enthusiasm for the subject of infant feeding has caused him to devote far too large a proportion of space to its consideration, to the detriment of many equally important subjects, which are much too briefly described in the later part of the volume.

The section of the home modification of milk simply bristles with tables of analysis and mathematical formulæ of so intricate and elaborate a description, that we very much doubt whether the average mother or nurse will be able to follow the instructions laid down for their guidance in preparing an infants' food.

Rotch does not consider that the emulsification of fat is destroyed by separation, nor does he believe that there is any evidence to show that sterilised milk is a cause of scurvy. The first chapter, which is devoted to the physiology and to the development of the child, is particularly good, and it contains much useful information regarding the clothing, hygienic management, and other important points bearing on the upbringing of children.

We are glad to notice in the present edition, which has been carefully revised and considerably extended, that rickets and scorbutus, which were previously considered under the unclassified diseases, have now been placed in their proper position as disorders of nutrition; but the relegation of acute rheumatism to the section of specific infectious diseases is a somewhat unusual classification.

There is absolutely no reference made to the recently discovered diplococcus described by Paine and Poynton, which is now pretty generally admitted to be the cause of acute rheumatism.

The section on the diseases of the nervous system is disappointingly short, but this is to some extent compensated for by the extremely interesting description of the diseases of the stomach and the intestines, and by a well-written chapter on the blood and ductless glands. The author is not a believer in drugs, but pins his faith almost entirely to hygienic and dietetic measures in the treatment of the diseases of children.

The book, which is to a large extent the fruit of the author's wide and varied personal experience, is a valuable addition to pediatric literature, but its reputation will mainly depend upon the chapters on infant feeding, which are full of scientific interest. The volume is well indexed and profusely illustrated, and many of the plates illustrating the intestinal disorders are particularly fine.

G. H. MELVILLE DUNLOP.

Reports of the Society for the Study of Disease in Children. Volume III. Edited by GEO. CARPENTER, M.D. London: J. & A. Churchill.

THE third number of these reports will bear favourable comparison with its predecessors. The volume contains many valuable contributions and interesting reports of cases, but probably the papers that will attract most attention are the series of articles on tuberculous peritonitis, by recognised authorities on the subject. Cautley contributes a well-written paper on the etiology of this condition; the symptoms and diagnosis are described by Drs. Barr, George Carpenter, and Parkinson; the pathology and morbid anatomy is dealt with by Theodore Fisher and Wayland Chaffey; the prognosis by G. A. Sutherland; and the treatment by James Carmichael, Guthrie, and Watson Cheyne,—all of which papers will well repay careful perusal. The book contains many other excellent articles, but we are prevented from discussing them here by the limited space at our disposal.

The Care and Feeding of Children. By L. EMMETT HOLT, M.D., LL.D., with an Introduction by ERIC PRITCHARD, M.A., M.D., M.R.C.P. Third Edition. London: Sidney Appleton. 1904.

THIS excellent little manual, which is one of the catechism series, is dedicated by the author to the mothers of Great Britain and America. It is written in the form of question and answer, and contains many useful directions expressed in simple, concise, and plain language, regarding the hygiene of the nursery, the preparation of infants' food, and the care and general upbringing of children. It may be recommended as a safe guide to mothers and nurses who desire to have a reason for the faith that is in them, and who do not wish to trust entirely to rule-of-thumb knowledge in the rearing of their charges.

The Physiological Feeding of Infants. By ERIC PRITCHARD, M.A., M.D., M.R.C.P. Second Edition. London: Henry Kimpton. 1904.

THE publishing of books treating of infant feeding shows no signs of becoming exhausted, and it seems to be the desire of every budding pediatric physician to add a stone to the rapidly growing cairn of literature devoted to this question. The volume under review is an excellent epitome of the subject, and is constructed on the usual lines, containing chapters on breast-feeding, percentage feeding, and the modification of milk. Although the author is a disciple of Rotch's and an enthusist in favour of percentage feeding, he does not advocate the system of laboratory feeding, so largely adopted by American physicians in the preparation of infants' food. He considers that the less milk is chemically or mechanically interfered with the better it is for the infant who consumes it, and he recommends a plan of his own for the home modification of milk which he claims is neither too elaborate nor too detailed. The latter half of the book is devoted to a consideration of the development and physiology of the infant, and contains an interesting chapter on the preparation of milk in special diseased conditions, with illustrative cases. An Appendix, containing a number of useful recipes, completes this instructive and well-written little volume.

Fatigue. By A. Mosso, Professor of Physiology in the University of Turin. Translated by Margaret Drummond, M.A., and W. B. Drummond, M.B., C.M., F.R.C.P.Ed. London: Sonnenschein & Co.

This well-known book is the work of the Italian physiologist who has done so much to explain the nature of fatigue phenomena, and to show how the subject may be experimentally studied. The translators have performed their task well, preserving the light and pleasant style of the original. It is a book which appeals to the general reader as much as to the scientific worker. The chapters which are, perhaps, of most value are those which deal specially with the author's work on fatigue records, taken with the ergograph, both in cases of muscular and intellectual exertion. The free and pleasant style of the writer, his broad outlook upon conditions of life in different animals and races of men, lend a character to the book which is lacking in most of its kind.

The Purin Bodies of Food Stuffs. By I. Walker Hall, M.D. Manchester: Sherratt & Hughes. 1903.

The work upon this important subject has been collected and arranged in readable form, while certain additions have been made by the author which increase the value of this monograph. The first three chapters are devoted to a description of the chemistry of food purins, methods employed for their estimation, and a short chapter containing mainly analyses by the author on the amounts of purin bodies in meats, vegetables, and beverages. The remaining chapters, dealing with the metabolism of these bodies under physiological and pathological conditions, will repay perusal by all who are interested in questions relating to metabolism. A short description of the author's purinometer, and the method of using it, is given in one of the final chapters.

A Treatise on Diseases of the Rectum, Anus, and Sigmoid Flexure. By Joseph M. Mathews, M.D., LL.D. New York and London: D. Appleton & Co.

This work, which is essentially an exposition of the author's own views on the subjects of which it treats, now appears in a third edition. It has been very carefully revised in the light of the writer's more extensive experience, but, as the work of other authorities in this department of surgery receives comparatively little attention, its general outlook is to some extent limited, and its value as a work of reference correspondingly diminished. This observation is in no way depreciatory of Dr. Mathew's work, or of his opinions on rectal surgery, both of which we hold in high esteem; it merely indicates the limits he has set himself. Within these limits he has presented us with a thoroughly reliable and eminently practical treatise, written in clear and forcible language, and illustrated by concise histories of instructive cases.

The figures throughout the text are somewhat disappointing, there being an undue proportion of surgical instruments depicted. The "sachet for rectal instruments" on p. 514, so far as we can see, differs in no way from a sachet for anything else, and the figure seems out of place in the middle of the description of an operation for prolapsus ani. The six coloured plates (with the possible exception of Plate iv.) are neither instructive nor artistic, and they add nothing to the value of the work. ALEXANDER MILES.

NOTES ON BOOKS.

WE have before us Volumes xxx. and xxxi. of the *St. Thomas's Hospital Reports*, edited by Dr. H. P. Hawkins and Mr. W. H. Battle (J. & A. Churchill, London), which contain a record of the work done in the hospital during the years 1901 and 1902. The greater part of each volume is taken up with a statistical summary of the cases treated in the different departments of the institution. The tables have been compiled with great care and in great detail, and valuable summaries of the more interesting cases are furnished. Several interesting papers are included in each volume, among which may be mentioned Mr. Corner's "Plea for a Revision of the Classification and Pathology of Intussusceptions." The author believes that double intussusceptions are far more common than single; in his own series of fourteen cases, no fewer than ten (72 per cent.) were double. Dr. Hawkins and Dr. Colman report cases of cirrhotic ascites which were greatly benefited by operation; and Mr. Robinson contributes an instructive paper on "Dermoid Cysts and some allied Congenital Defects." Appreciative obituary notices of Sir William MacCormac, Mr. Wm. Anderson, and Dr. W. M. Ord, indicate how highly these distinguished men were esteemed in St. Thomas's, and how much their loss is felt by the hospital.

The most striking contribution of Volume lviii. of *Guy's Hospital Reports* (J. & A. Churchill, London) is a collection of cases of "Malignant Disease of the Stomach," culled from the archives of the hospital from 1826 to 1900, by Sir Cooper Perry and Dr. Lauriston E. Shaw. The cases number 306, and the abstracts of the clinical histories and post-mortem records occupy over two hundred pages. One of the avowed objects of this compilation is to afford material for establishing a comparison between the results of treatment, curative and palliative, in the non-operation era, and in the era which the authors anticipate is coming, in which operative measures will be more and more generally employed in the treatment of gastric cancer. The authors also desired to "make more accessible to the profession at large some of the treasures hidden in the pathological records of Guy's Hospital." We cannot doubt that their laborious efforts will prove of value to all workers in this field of research, and we are entirely with them in the opinion that the space devoted to such a collection of facts is more profitably employed than in furnishing statistical tables in which important and unimportant cases are promiscuously mixed.

The influence of heredity in angeio-neurotic œdema seems proved from the record of Dr. Ensor's case. He has obtained reliable information regarding eighty persons related to one family, and of these thirty-three suffered from the affection. Among other interesting papers in this volume may be mentioned that "On Disease of the Heart due to Over-indulgence in Alcoholic Drinks," by Dr. Hale White; Dr. Fortescue Brickdale's "Investigations on Intravenous Injections of Drugs"; and Dr. French's "Study of Eosinophilia in Skin Diseases."

The *Reports of King's College Hospital* (Vol. vi.) (Adlard & Son, London), contain several valuable papers. Dr. Aldren Turner deals with "Some Points in the Prognosis of Epilepsy," Dr. Still with "Nephritis in Children," Dr. Murray Leslie with the "Symptoms and Physical Signs in Thoracic Disease," and Captain French, R.A.M.C., with the "Action of Drugs in Syphilis." The statistical and analytical report of the work of the hospital during 1901 occupies the rest of the volume, and has been compiled on the same lines as in previous years.

The latest volume (v.) of the *Philadelphia Hospital Reports*, edited by Dr. Herman B. Allyn (Maurice H. Power, Philadelphia), is not so large as some of its predecessors, but it in no way falls behind them in the quality of the material it contains. Papers on medical subjects greatly predominate, and neurological subjects bulk very largely in the table of contents. We would specially commend the brevity of the various articles, no fewer than twenty-eight papers being contained in 140 pages, and this without the papers being in any sense scrappy.

The *Reports of Mount Sinai Hospital* (Vol. iii.), edited by Dr. N. E. Brill, contain the records of the work done in 1901 and 1902. In addition to the general statistics of the hospital, brief abstracts of the more important and interesting cases are given in a way which renders them easy for reference, and useful to those who are in search of reliable clinical data. An interesting and probably unique case of complete fibrous obstruction (congenital?) of the superior and inferior venæ cavæ in a young man, is reported in detail by Dr. Meyer. Dr. Berg analyses a series of sixty-six operations for cholelithiasis, Dr. Lilienthal deals with suprapubic cystotomy in operations on the prostate, and Dr. Vineberg reports a series of nine cases of ectopic gestation. The contributions from the pathological department include a paper on the "Growth of Bacteria on Media containing Sugars and Serum," on "Paracolon Infection," by Dr. Libman, and other valuable contributions to bacteriology by Drs. Celler and Bernstein.

RECENT ADVANCES IN MEDICAL SCIENCE.

MEDICINE.

UNDER THE CHARGE OF
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Cyto-Diagnosis of Effusions and Cerebro-Spinal Fluid.

Dana and Hastings ("Cyto-diagnosis in Nervous Disease," *Med. Rec.*, N. Y., 1904, Jan. 23) to some extent confirm Widal's work on the value of cyto-diagnosis in nervous diseases, especially in the recognition of syphilis and "parasyphilis," *i.e.*, general paralysis and tabes. The normal pressure of the cerebro-spinal fluid is 40 to 60 mm.; under pathological conditions it may rise to 800 mm. Its specific gravity is 1003–1004, and its freezing point 0°·72 to 0°·78. In acute diseases the congelation point falls, and in tuberculous meningitis may sink to 0°·50 or 0°·56. Normally it contains practically no cells, and only a small amount of proteid. The technique of the method is important, according to Hastings. 6 c.c. of freshly drawn cerebro-spinal fluid are centrifuged at 1800 revolutions per minute for a quarter of an hour, in a tube drawn out to a narrow end; the tube is then inverted and the fluid poured off except a drop which remains in the narrow end. This is withdrawn by a capillary pipette and blown on to a slide or spread on cover-glasses. It may be examined in the fresh state or after staining in the usual way with hæmatoxylin or the triacid mixture; a Leitz No. 4 ocular and No. 7 objective should be used. In normal specimens careful search over three or four slides may reveal a few (under ten or twelve) lymphoid and red cells. The presence of three or four cells in a field is regarded as indicating chronic meningeal disturbance. To estimate the approximate number of cells 100 fields should be counted and the average taken. In differential counting all that is required is to ascertain the proportion of mono- and poly-nuclear cells, hence any simple nuclear stain is sufficient. Dana's investigations extend to twenty-two patients. In eight cases of general paralysis there was marked lymphocytosis, in two no cells were found (possible error in technique), in one only six, and in another only three cells in 100 fields. In all his cases of alcoholic psychosis, cells were absent or few (three to six per 100 fields). In cerebellar tumour and hydrocephalus no cells were found. In three cases in which the diagnosis lay between alcoholism and general paralysis, cells were present in large number twice, absent once. In a case of spinal gliosis with symptoms pointing to multiple sclerosis, the absence of cells enabled Dana to exclude this as well as any syphilitic lesion. Cyto-diagnosis therefore seem likely to be of great help occasionally in diagnosing early and doubtful cases of tabes, and in determining whether there is or is not a syphilitic invasion in the nervous system. It is also of help in determining whether the process is active, inflammatory changes being accompanied by the presence of poly-nuclear leucocytosis, while under ordinary conditions of specific infection only mono-nuclears are present with perhaps a proportion of poly-nuclears not over 30 per cent.

The general subject of "Cytology of Effusions" is the topic of a valuable paper by Earl in the *Dublin Journ. Med. Sc.*, 1903, December. In the distinction between endothelial and cancer cells the following two points are worthy of attention:—(1) Cancer cells frequently contain glycogen, which is rarely present in endothelium; (2) mitoses are common in cancer cells but are not found in shed endothelium. Widal's formula runs: Where a half or more of the cells in a pleural effusion are lymphocytes, it is tuberculous; in acute infections there is a poly-nuclear leucocytosis; in mechanical transudations endothelial cells predominate. The results of the cytological examination of pericardial and peritoneal effusions of cerebro-spinal fluid, and of effusions into the tunica vaginalis and joints, though generally agreeing with the above statement, are not so consistent as those of pleural fluid. One of the difficulties in cyto-diagnosis is to distinguish between lymphocytes and leucocytes which have altered either (*a*) by swelling and approximation of the segments of the nucleus, or (*b*) by breaking up into fragments each of which contains a portion of nucleus surrounded by protoplasm. In the first case, careful focussing shows the true state of matters: while in the second case the "pseudo-lymphocytes," as they are called, are characterised by neutrophile granules, a wide zone of protoplasm, their occurrence in poly-nuclear effusions, and a light rose-staining of their protoplasm with methyl-green pyronin. Altered endothelial cells are always too large to be mistaken for lymphocytes. In *primary tuberculous pleural effusions*, during the first ten days poly-nuclear leucocytes are always present, the earlier the case and the more acute the process the more numerous are they; sometimes endothelial cells are also very numerous at the commencement. Soon, however, the lymphocytic nature of the effusion becomes manifest, these cells running up to 60 or 80 per cent. *Secondary tuberculous effusion* in phthisis shows both poly-nuclears and lymphocytes on account of the mixed infection. *Acute infective effusions*—pneumococcal, streptococcal, typhoid, and rheumatic—all give a poly-nuclear leucocytosis. *Mechanical effusions* contain endothelial cells at first, which disappear as the effusion becomes older. An infarct leads to a poly-nuclear leucocytosis. *Pericardial effusions* usually give results conformable to Widal's formula. *Peritoneal effusions* of tuberculous origin are either lymphocytic throughout, or poly-nuclear at first and lymphocytic later; the examination of peritoneal transudates has so far given discordant results. *In chronic essential hydrocele* the fluid contains either no cells at all or endothelium; in gonorrhœal hydrocele it contains poly-nuclear leucocytes, and in tuberculous hydrocele chiefly lymphocytes. Lymphocytes or even poly-nuclear leucocytes may appear from any irritation, such as puncture, apart from any bacterial infection, and the cell contents on the whole depend more on the clinical characters of the hydrocele than on its nature; thus endothelium alone may occur in any chronic effusion irrespective of its cause. With regard to *articular effusions*, the following may be laid down:—(1) In gonorrhœal cases—if acute, poly-nuclear leucocytosis; if subacute, poly-nuclear and endothelial cells; if afebrile, lymphocytes. (2) In rheumatic cases—if acute, poly-nuclear cells; if chronic, lymphocytes and endothelium. (3) In tuberculous cases, lymphocytes. (4) Puncture or other irritants cause increased lymphocytes and poly-nuclears. (5) Absence of endothelial cells does not show that an effusion is tuberculous. (6) The presence of poly-nuclears is not a sign of bacterial origin, but of any acute process—toxic or traumatic. The results of the cyto-diagnosis of *cerebro-spinal fluid* are not so easy to interpret. The fluid being normally free from cells, their presence indicates a meningeal reaction. To take *meningitis* first: in non-tuberculous meningitis there is a poly-nuclear leucocytosis, and if the case—*e.g.*, the epidemic form—improves, this is replaced by lymphocytosis, and finally all the cells disappear. In tuberculous meningitis there is a lymphocytosis at first, not so great as in pleural effusions, often only about 30 per cent. At a later period poly-nuclear cells may predominate (the reverse of what happens in pleural effusions). Sometimes the poly-nuclears alone are present; in other cases no cells are found. These discrepancies are correlated to the variable course of disease; the purest lymphocytosis is found in young children, in whom the progress of the malady is rapid, while poly-nuclear leucocytosis is associated with more chronic cases, in which caseation or a secondary infection may occur. In *chronic organic nervous diseases* the chief results are that in tabes, general paralysis, and syphilitic meningo-myelitis, cells are found, lymphocytes predominating. In multiple sclerosis and Friedreich's ataxia, lymphocytosis is sometimes present. In neuritis, hemiplegia, hysteria, and mental affections generally there is no increase of cells. As to the explanation of the presence of lymphocytes in one set of cases, poly-nuclears in another, two views are possible—(1) They are specific chemiotactic reactions to specific stimuli (toxins); or (2) they are related to the chronicity or acuteness of the process, irrespective of its nature.

Fränkel, writing on "Lymphocytosis of the Cerebro-spinal Fluid," *Med. Rec.*, N. Y., 1904, January 23), quotes Concetti's view, that a preponderance of lymphocytes implies a toxic irritation; of poly-nuclears, a bacterial infection. He reports on the examination of thirty-three cases, which we group as follows:—(1) Tabes cases, in all of which increase of the cells was found. (2) General paralysis, multiple sclerosis, cerebro-spinal syphilis, and tumour, in some of which a leucocytosis occurred. (3) Paralysis agitans, hysteria, poliomyelitis, aural vertigo, discharge of cerebro-spinal fluid from the nose in which no cells were found. Fränkel thinks that no positive inference can be drawn from the prevalence of one or other type of cell.

In a paper on the "Origin and Significance of the Cells of Pleural

Effusions," *Beitr. z. klin. d. Tuberculose*, Würzburg, 1904, Bd. ii. Heft 3, Vargas-Suarez comes to the following conclusions:—(1) Most lymphocytes found in pleural fluid are not degeneration products of other cells, but true lymphocytes which have actively emigrated from blood and lymph vessels. (2) Only a small percentage result from the breaking down of poly-nuclear cells. (3) Pleural lymphocytosis implies a slight infection of the pleura, *i.e.*, for practical purposes, in most cases tuberculosis. (4) Copious endothelial cells indicate a non-inflammatory exudation. (5) Numerous poly-nuclears show an acute infection of the pleura. In primary tuberculous pleurisy this only occurs in quite recent cases and mixed infections. (6) Pleural eosinophilia is probably not infective, but associated with dyspnœa and the presence of endothelial cells, and also with eosinophilia of the blood.

Meyer ("Cyto-diagnosis of Cerebro-spinal Fluid," *Berl. klin. Wchnschr.*, 1904, January 2) reports on thirty-five cases. Thirteen general paralytics were examined, eleven of those gave marked lymphocytosis; one, few mono-nuclears; and one, numerous mono-nuclears. In three suspected cases lymphocytosis was also present. Of seven chronic alcoholics, some had, others had not, lymphocytosis. Senile dementia, idiocy, hydrocephalus, epilepsy, and chronic paranoia gave very few lymphocytes. In dementia præcox five of the cases had no lymphocytosis, one showed numerous mono-nuclear leucocytes. In multiple sclerosis also there was mono-nuclear leucocytosis. Lymphocytosis is defined to mean the presence of ten to twenty lymphocytes in each field, of a magnification of 70 to 80 diameters, the films being made from the centrifugalised deposit of 3 to 4 c.c. of cerebro-spinal fluid. A number of fields must be examined. Meyer concludes that in almost all cases with chronic meningitic processes, lymphocytosis is present. He offers no explanation of the mono-nuclear leucocytes found in four of his cases.

SURGERY.

UNDER THE CHARGE OF

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Bacteriology of Appendicitis.

Lanz and Tavel (*Rev. de chir.*, Paris, 1904, July and August) have followed up their investigations on the bacteriology of peritonitis by a study of the bacterial flora of the normal appendix, the diseased appendix, and the appendicular abscess. Their investigation is based on a bacteriological analysis and clinical description of 130 cases of appendicitis, besides a number of normal appendices, and the results are full of interest. Their general conclusions are—(1) That the *normal appendix* is never sterile; it usually contains several species of organisms, the *Bacillus coli* being always present. Only in one case was the colon bacillus the only organism found. (2) The *pathological appendix* is sterile in 10 per cent. of cases. It usually contains the same varieties of organisms as the healthy appendix. The more diseased the appendix is, the smaller is the number of species of organisms found in it. (3) The *cystic appendix* forms a transition between the diseased appendix and the chronic extra-appendicular abscess. It is sterile in 37·5 per cent. of cases, and generally contains but a small number of species. (4) The *chronic extra-appendicular abscess* is sterile in 75 per cent., and when it is infective it contains very few species of bacteria. (5) The *acute extra-appendicular abscess* (the peri-typhlitic abscess) always contains bacteria, and there are usually a considerable number of species present, these being the same as are found in the normal appendix.

These results are at first sight surprising, but, as the authors point out, they are in perfect harmony with the pathology of inflammation. The fact that the normal appendix agrees with the large intestine in being the seat of many forms of bacteria, is well known. In the secretions of the pathological appendix there are many leucocytes, and an active phagocytosis goes on, which tends to reduce the number of organisms, to such an extent in some cases that the tube is rendered sterile. When the inflammation in appendicitis has completely subsided, the leucocytes disappear, and the appendix resumes its natural state with relation to bacteria. In the cystic appendix and in the chronic extra-appendicular abscess the same state of matters prevails. In the acute peri-typhlitic abscess, on the other hand, the bacteria are numerous, and their varieties and actions are the same as those of the organisms normally found in the intestinal canal.

INJECTION OF GELATIN IN THE TREATMENT OF ANEURYSM.

M. LANCEREAUX (*Bull. Acad. de méd.*, Paris, 1904, July) reports a further series of eight cases of aneurysm of the aorta, treated by subcutaneous injection of gelatin. Six of the patients derived marked benefit from the injections; two died. In all cases the first effect of the injection is a diminution or even a complete cessation of the pain which usually accompanies aneurysm of the aorta. Later, the swelling gradually becomes harder and diminishes in size. If the treatment is persevered with over a period of some months, the sac becomes consolidated by the formation in it of blood clot, only a passage wide enough to admit of the flow of the column of blood remaining.

The solution employed contains in every 1000 grms. 7 grms. of chloride of sodium and 25 grms. of gelatin. Of this solution, 200 grms. (*i.e.* 5 grms. of gelatin) is injected at a sitting. This quantity is completely absorbed by the end of twenty-four hours. An injection may be given every third or fourth day. The method, in the hands of Lancereaux, has proved free of danger, but he lays great stress on the importance of using gelatin of the best quality, and ensuring the absolute sterility of the solution. It may be sterilised in an autoclave in steam under pressure, at a temperature of 115° for a period of thirty minutes. The occurrence of tetanus, suppuration, and other septic complications is, according to Lancereaux, due entirely to inefficient sterilisation, and can be avoided by due care.

In discussing M. Lancereaux's paper, M. Paul Reynier confirmed the opinions expressed, and added the reports of some cases of his own in which the treatment had been efficacious.

THE DANGER OF ALLOWING WARTS AND MOLES TO REMAIN, LEST THEY BECOME MALIGNANT.

KEEN of Philadelphia (*Journ. Am. Med. Ass.*, 1904, July 9) enters a plea for the early removal of warts and moles, on account of the risk of their assuming malignant characters, and he strengthens his case with an instructive series of twenty-five cases in which this happened, the malignant disease in the majority proving fatal. He admits that a great proportion of such conditions never do undergo malignant degeneration, but as it is impossible to forecast which will, he advises that all should be removed. The physician should not wait until the wart or mole begins to increase in size or show other signs of activity, before advising removal, as by that time it is already malignant. The operation should be done while the condition is still quiescent.

In the discussion which followed this paper, Rodman, Fütterer, Weir, Bevan, and Laplace all agreed that Keen's proposals were sound, although some anticipated difficulties in persuading patients of the necessity for operation. The perusal of the clinical notes appended to this paper forces on the mind of the reader his duty with regard to advising operation for this very common condition. The responsibility for refusal must rest with the patient.

OBSERVATIONS IN SARCOMA.

THESE observations by Dr. A. J. M'Cosh of New York (*Ann. Surg.*, Phila., 1904, August) derive their chief value from the fact that they embody the results of the experience of a single surgeon, and of one who has recorded and analysed his material with great care and precision. The records of 125 cases are considered. The author thinks that we now appreciate more fully than we did the importance of traumatism as an occasional exciting cause, but that in other respects we have learned little regarding the etiology of the condition during the last quarter of a century. He dwells upon the fact that a great variety of tumour growths are at present included under the term "sarcoma," many of which may in future be relegated to other varieties, but curiously enough he himself still includes among sarcomata the "giant-celled" form, which most pathologists are now agreed in considering under the term "myeloma"—a form of new growth which differs materially from the true sarcomata. The author also remarks on the "hesitation with which the pathologist pronounces upon certain growths which are merely suspicious of or resemble sarcoma," and he says that "most of us feel that the microscopical report in this class of tumours cannot be fully relied upon, but that the clinical picture is also sometimes needed in order to arrive at a positive decision concerning the exact nature and malignancy of the growth."

Of the 125 cases, sixty occurred in females and sixty-five in males. The greatest number (forty-one) occurred between the ages of 30 and 40 years. This is not quite in accord with some of the notions that prevail, that sarcoma mainly develops in young adults. Ninety-eight of the cases have been traced; fifty-one have died of recurrence or metastasis; five are still alive, although suffering from recurrence; thirty-nine have survived the operation for one year or longer.

PEPTIC ULCER OF THE JEJUNUM.

MAYO ROBSON (*Ann. Surg.*, Phila., 1904, August) reports what he believes to be the first case of peptic ulcer of the jejunum recorded in this country. Fourteen cases have been reported by continental surgeons. The true cause is probably a mild form of sepsis leading to gastritis and excess of free HCl in the gastric juice. Peptic ulcer is liable to occur after gastro-enterostomy, particularly (as in the author's case) after the anterior operation. In all the cases hitherto recorded the ulcer has perforated, and has been diagnosed after operation. The treatment consists in detaching adhesions and repairing the perforation. The author thinks that probably in the greater number of cases an excision of the portion of the intestine involved and the performance of a Roux's Y-operation will give the best results. This was the procedure carried out in the author's case, and it was successful.

CASTRATION FOR TUBERCULOSIS OF THE TESTIS.

FROM a consideration of recent work on this subject, Cumston (*Am. Journ. Med. Sc.*, Phila., 1904, June) concludes that the radical treatment by removal of the affected testis should not be allowed to become obsolete. The operation has an exceedingly low mortality, and if performed at an early period of the disease, there is a good chance of preventing further infection by the tubercle bacillus taking place. Conservative treatment is practically useless when the organ is affected by tuberculosis, and it allows dangerous consequences to arise which the radical treatment directly tends to avoid. Infection of the prostate and urinary organs, as Kocher and König have pointed out, is no contraindication to castration, as the removal of the affected testis has a favourable action on the disease located in other parts of the genito-urinary system, as well as in the general condition of the patient. The importance of removing as much of the vas deferens as possible is duly emphasised, and attention is drawn to König's observation that the tuberculous process tends to develop where bends or curves occur on the canal. The attempts which have been made to remove the diseased portions, and form an anastomosis between the healthy testicular tissue and the vas deferens, with a view to conserving the function of the gland, have not been encouraging. The fact that tubercle may occur in the other testis is no reason for refusing to remove one gland while it alone is diseased. Recent statistics indicate that the frequency with which the disease occurs in the second testis and in the other parts of the genito-urinary system, has been over-estimated. The frequency with which psychical changes occur after removal of both testes has also been exaggerated.

OBSTETRICS AND GYNÆCOLOGY.

UNDER THE CHARGE OF

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STUDY OF OVARIAN PREGNANCY.

WEBSTER (*Am. Journ. Obst.*, N. Y., 1904, July) adds another to the few carefully described examples of this condition. P., æt. 36, ten years married, twice pregnant, complained of sudden right-sided pelvic pain after eight weeks amenorrhœa. Tumour felt in the right fornix, removed by abdominal section. On examination it measured 8 by 7 cms., the wall was intact and the tube was normal. On section, there was found a well-formed amniotic cavity 2·2 cms. by 1·5 cm. The outer portion of the swelling was composed of connective tissue, containing in its meshes large, irregularly outlined, multinucleated cells, resembling decidual cells. Few Graafian follicles were found. Webster's specimen differs from others previously described, in that there was no evidence of the gestation having begun in a Graafian follicle, as no corpus luteum was found in the wall of the sac. As he points out, the method of embedding of the ovum in ovarian pregnancy is of the greatest scientific interest. He discusses his view, as applicable to ovarian pregnancy, that the fertilised ovum can only begin its development in tissue derived from the Müllerian tract. He refers to the observation made by Schmorl, of areas of decidual cells found on the surface of the ovary in uterine pregnancy, and suggests that those areas may represent Müllerian tissue. The paper is fully illustrated.

FULL-TERM ABDOMINAL PREGNANCY.

GUTIERREZ (*Rev. de gynéc. et de chir. abd.*, Paris, 1904, May) reports what he believes to be a genuine case of this condition. P., æt. 34, multipara, came under observation on account of an abdominal swelling occupying the hypogastric and umbilical regions, and corresponding in size to an eight months pregnancy. The tumour was partly cystic, partly solid. No fœtal parts could be made out, the uterus was mobile, and the tumour did not enter the pelvis. On operating, the tumour was found adherent to the abdominal wall and omentum. During manipulations to remove adhesions, the tumour ruptured, and a fœtus escaped. The pelvic organs were quite healthy. The placenta was implanted on the omentum. The wall of the sac was 1 cm. thick and its internal surface was smooth and lined with amnion. The placenta was very adherent to the sac, especially that part bound to the great omentum. In discussing the case, Gutierrez points out that there were none of the symptoms of the ordinary terminations of tubal pregnancy beyond those of the death of the fœtus, and he bases his diagnosis on the healthy condition of the pelvic organs, and the absence of signs pointing to any connection between them and the abdominal tumour.

RARE ACCIDENT TO FIBROID TUMOUR COMPLICATING PREGNANCY.

Hamilton (*Austral. Med. Gaz.*, Melbourne, 1904, April 20) reports the following case:—A patient suffering from subperitoneal myomata of the uterus became suddenly collapsed twenty hours after a normal confinement. Intra-peritoneal hæmorrhage was diagnosed, and on abdominal section a large quantity of blood escaped. The source of the hæmorrhage was found to be a ruptured vein on the surface of one of the subperitoneal myomata. The tumours were removed, and the abdominal cavity irrigated with saline solution. A piece of omentum had become adherent to the capsule of one of the tumours, and as the result of uterine contractions the attachment had become separated, and opened the vein, with the result reported.

THE EFFECT OF HYSTEROPEXY ON PREGNANCY.

Oui (*Rev. de gynéc. et de chir. abd.*, Paris, 1904, June) discusses this question with reference to ventro-fixation and vagino-fixation. (1) *Ventro-fixation.*—Provided that the uterus is fixed with its anterior surface to the abdominal wall, below the level of the insertion of the tubes, no harm results to the course of labour. Fundal fixation, especially if close to the symphysis pubis, is unfavourable. The pregnant uterus then develops entirely at the expense of the posterior uterine wall, the anterior wall becomes thickened, forming an obstruction to the pelvic inlet, resulting in difficult labour from malpresentation. (2) *Vagino-fixation.*—In this method the results are very unfavourable, abortions and difficult labours being frequent. Oui believes that vagino-fixation should be limited to cases beyond the child-bearing period.

ADRENALIN IN GYNÆCOLOGY AND OBSTETRICS.

Fenomenoff (*Therapia*, Bruxelles, 1904, No. 1) finds that the effect of this drug on the uterine mucosa is not the same as that on the vagina. In colporrhaphy there is no decrease in the amount of bleeding. When, however, the uterine mucosa is treated with the preparation, the blood lost after curetting is much less. As the result of observations, made from experiments upon rabbits, Fenomenoff believes that a solution of adrenalin may be a most useful styptic after the separation of adhesions during abdominal operations.

ISCHURIA IN RETROFLEXION OF THE GRAVID UTERUS.

Reed (*Am. Journ. Obst.*, N. Y., 1904, February) believes that retention of urine in this condition is not due to direct compression on the urethra, but is a form of "pressure paralysis," due to interference with the nerve supply of the bladder. The most frequent source of retention is compression on the chief motor (pelvic) nerve. Any pathological conditions of the pelvis and abdomen which irritate the sensory fibres of the bladder produce the condition of "irritable bladder." Retention of urine after labour, or laparotomy for the removal of tumours, is due to diminished intra-abdominal pressure and weakness of the abdominal muscles from over-distension.

ACTINOMYCOSIS OF BOTH OVARIES.

Geldner (*Monatschr. f. Geburtsh. u. Gynæk.*, Berlin, Bd. xviii.) reports a case of actinomycosis confined to both ovaries. The ovarian tissue was throughout studded with the disease. Geldner supposes that the infection of one ovary had apparently taken place through a fistula from a tuberculous hip-joint, and that the disease of the other ovary was a metastasis.

SUPPURATION OF AN OVARIAN CYST AFTER TYPHOID FEVER.

Zantschenko (*Monatschr. f. Geburtsh. u. Gynæk.*, Berlin, Bd. xix.) reports a case of removal of a suppurating ovarian cyst eight months after typhoid fever. Examination of the fluid for micro-organisms and cultures obtained, proved that the infection was due to the typhoid bacillus, and had occurred through the blood stream at the time of the fever.

THERAPEUTICS.

UNDER THE CHARGE OF

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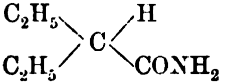
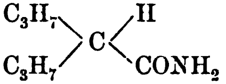
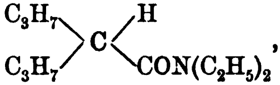
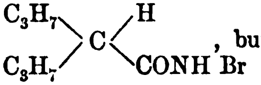
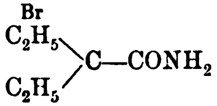
ON THE RELATIONSHIP BETWEEN CHEMICAL CONSTITUTION AND HYPNOTIC ACTION.

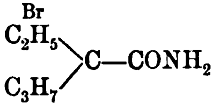
Fuchs and Schultze summarise their researches in this paper. They started with the assumption that in the sulphones, *e.g.* sulphonal and trional, the sulpho group SO_2 has no hypnotic action, but merely serves as a link firmly binding the ethyl groups to the carbon atom. The ethyl group possesses a special affinity for nervous tissue, and the hypnotic action is due to it. The ketones, as a class, proved to be without any hypnotic effect. The ketoximes in various forms exerted a hypnotic action, but, owing to the development of unpleasant additional action, *e.g.* spasms, vomiting, diarrhœa, they are unsuited for use as medicines. The next class to be investigated was the acetamides.

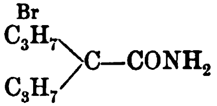
Diethylacetamide  $\begin{matrix}\mathrm{C_2H_5}\\ \mathrm{C_2H_5}\end{matrix}\!>\!\mathrm{C}\!<\!\begin{matrix}\mathrm{H}\\ \mathrm{CONH_2}\end{matrix}$ has only a slight action.

The dipropylacetamide  $\begin{matrix}\mathrm{C_3H_7}\\ \mathrm{C_3H_7}\end{matrix}\!>\!\mathrm{C}\!<\!\begin{matrix}\mathrm{H}\\ \mathrm{CONH_2}\end{matrix}$ produces very prolonged sleep, not quite so marked as with veronal, but stronger than with the other ordinary hypnotics—chloral hydrate, paraldehyde, trional, sulphonal, amylene hydrate, or dormiol. The attempt to intensify the action by introducing an ethyl group into the amide group was not successful. The resulting preparation was found to produce spasms. The further introduction of a second ethyl group  $\begin{matrix}\mathrm{C_3H_7}\\ \mathrm{C_3H_7}\end{matrix}\!>\!\mathrm{C}\!<\!\begin{matrix}\mathrm{H}\\ \mathrm{CON(C_2H_5)_2}\end{matrix}$, giving dipropylacet-diethylamide, robbed the preparation of all action.

The next step was to replace one of the H atoms of the amide portion in dipropyl-acetamide by bromine  $\begin{matrix}\mathrm{C_3H_7}\\ \mathrm{C_3H_7}\end{matrix}\!>\!\mathrm{C}\!<\!\begin{matrix}\mathrm{H}\\ \mathrm{CONH\,Br}\end{matrix}$, but this also had no action. On the other hand, if the Br was introduced into the acetic acid portion, the hypnotic action was distinctly increased. They manufactured the following substitution products:—

Brom-diethylacetamide  $\begin{matrix}\mathrm{Br}\\ \mathrm{C_2H_5}\\ \mathrm{C_2H_5}\end{matrix}\!>\!\mathrm{C{-}CONH_2}$

Brom-ethylpropylacetamide  $\begin{matrix}\mathrm{Br}\\ \mathrm{C_2H_5}\\ \mathrm{C_3H_7}\end{matrix}\!>\!\mathrm{C{-}CONH_2}$

Brom-dipropylacetamide  $\begin{matrix}\mathrm{Br}\\ \mathrm{C_3H_7}\\ \mathrm{C_3H_7}\end{matrix}\!>\!\mathrm{C{-}CONH_2}$

The two former are crystalline bodies, the latter is a yellowish oily substance. All three exert a powerful hypnotic action on dogs. In each case the action was stronger than that of chloral hydrate, but not so marked as with veronal. Of the three, the most suitable preparation appears to be the brom-diethylacetamide. To this the name of neuronal has been given. The authors have studied its action on human beings. They find that the average dose required to produce sleep is 1 grm. For slight cases of sleeplessness 0·5 grm. may be sufficient, while obstinate cases require 1·5 to 2 grms. It is recommended to drink some hot fluid, *e.g.* warm tea, after swallowing the drug, as this increases the action. The preparation has proved a useful hypnotic, free from unpleasant side effects. In a few instances it seemed to relieve headache. The amount of bromine in neuronal is relatively high = 41 per cent. Animal experiments have shown that the excretion of the bromine is slow, so that possibly the drug may be useful in epilepsy. The few investigations on epileptics hitherto made are, so far, satisfactory. —*München. med. Wchnschr.*, 1904, No. 25.

THE TREATMENT OF SYPHILIS.

CHRISTIAN takes a distinctly optimistic view of the curability of syphilis. If seen early in the secondary stage and treated properly, syphilis is, in the majority of cases occurring among the upper and middle classes in individuals of good health and of fairly good habits, a perfectly curable disease. If it occurs among the half-starved poor and in habitual drunkards, the disease cannot be cured. The same may be said for cases having once developed tertiary symptoms. Treatment can cause their disappearance, but cannot cure the disease. Christian holds that it is well to wait for the development of cutaneous lesions before commencing constitutional treatment, except when the chancre is situated on the lip or finger, *i.e.*, where it could readily infect others. And also in the rare cases where the primary sore becomes phagedænic. In other cases it is well to wait for the appearance of secondary symptoms, since they confirm the diagnosis, and early constitutional treatment does not prevent their appearance. The most common type of the disease among well-to-do people is a benign form, which has little tendency to relapse and readily cures under mercurial protoiodide, ⅓ gr. thrice daily. A benign type with a tendency to relapse is seen among individuals whose general system is somewhat under par. In this form there is a constant tendency to the recurrence of moist papules about the mouth and anus. Here tonic treatment should be combined with mercurials. Christian tells his patients to take an extra ⅓ gr. protoiodide pill every day till the teeth become slightly tender, or the gums bleed on being touched. This number of pills is then divided by two, and this number is continued along with tonic treatment. If there is any relapse or fresh outbreak, the patient is put on his maximum allowance again. In the third form the secondary symptoms are severe, with fever, loss of flesh, headache, and nocturnal pain in the bones. Here the gastro-intestinal tract is so much upset that the mercury is but indifferently absorbed, and mercurial inunctions are indicated. To prevent dermatitis, the skin should be thoroughly cleaned with green soap and spirit, before rubbing in the ointment. Frequent warm baths should be taken. When the skin lesions have disappeared, if the general condition is good the inunctions can be replaced by pills.

The patient must be treated as well as the disease. At the outset, the patient's weight is the best criterion. If he does not gain in weight, he is either getting too little or too much mercury. The active mercurial treatment should be kept up for eighteen months. Then the patient may be put upon a mild form of mixed treatment, $\frac{1}{12}$ gr. perchloride with 2 to 5 grs. of iodide thrice daily. This should be kept up steadily for one year. For the next six months intermittent treatment should be instituted, at the end of which time, if no lesions develop, treatment may be safely discontinued. Such treatment, faithfully carried out, will cure about 75 per cent. of cases occurring in individuals of good health. Where tertiary symptoms have appeared, we cannot promise a permanent cure. Here again mixed treatment is more efficient than the iodides alone.—*Therap Gaz.*, Detroit, 1904, June.

DIGALEN (AMORPHOUS DIGITOXIN).

CLOETTA under this name has introduced an amorphous digitoxin, which presents certain advantages compared with the crystalline digitoxin employed at present. Cloetta thinks that there is great need for such preparations of the active principle in preference to the fluid preparations of the digitalis leaf. The fresh leaf differs enormously in activity, and drying further intensifies the variability. Thus the leaf fresh gathered in September may show a difference of 400 per cent. as contrasted with the same leaf dried and kept till the following July. The fluid preparations present similar differences in activity. The active constituent of the digitalis leaf is, according to Cloetta, digitoxin. Consequently a rational therapy requires a preparation of this active principle. Hitherto the one most employed has been the crystalline digitoxin, but unfortunately this preparation has proved very insoluble and extremely irritating, both to the stomach and subcutaneous tissues. It also requires a considerable time for the specific digitalis action to develop. As the result of five years' experimenting, Cloetta claims to have isolated by a complicated process, of which the details are not given, a white amorphous body, which, in its chemical constitution and pharmacologic action, is identical with crystalline digitoxin. The amorphous form is much more soluble in water. It is not a colloid modification, since the amorphous form is much more diffusible than the crystalline, as has been shown by dialysation experiments. The local irritating effect is reduced to a minimum, so that the drug may be used either by the mouth, rectum, or by injection into the veins or subcutaneous tissue. The drug is put on the market under the name of digalen, by Hoffmann, La Roche, & Co., Basel, in small bottles, containing a solution in glycerin and water. Each cubic centimetre contains 0·3 mgrm. of the amorphous digitoxin. With each bottle a small pipette is given, for the purpose of accurate measurement. The ordinary dose is 0·3 mgrm., and the maximum amount to be given daily is 1·2 mgrm. Kottmann, in Naunyn's clinique, has used the new preparation for upwards of a year, with satisfactory results.—*München. med. Wchnschr.*, 1904, No. 33.

SERUM TREATMENT OF RHEUMATIC FEVER.

WHEN he introduced the serum treatment of rheumatic affections in 1902, Menzer showed that in protracted acute and chronic cases the serum was able to cause reaction and improvement. The question of the protective action against further attacks, and the subsequent development of cardiac lesions, had to be left undecided. He attempts by a review of cases treated in 1902–3 in the Charité to settle this aspect of the treatment. For this purpose he has re-examined, in the early part of 1904, the majority of his old cases, dating from over a year.

Menzer's conception of acute rheumatism is that it is a streptococcic invasion, due to absorption from the upper air passages. The local manifestations of arthritis, pleurisy, endocarditis, are essentially healing processes, a reactive hyperæmia leading to the destruction and absorption of the bacillary foci formed in the beginning of the disease in organs specially liable to streptococcic invasion. Consequently, his therapeutic aim is not to cut short these inflammatory manifestations, but to aid the organism in its healing reaction. From his point of view it is impossible to prevent endocarditis; the real question is, given an endocarditis, what method of treatment gives the best expectation of cure?

The cases are arranged in various groups. The first group consists of twenty-nine cases, which came under treatment within thirty days of their first attack of rheumatic fever. All of these cases recovered on an average treatment of forty-six days. In one case there was a slight impairment of mobility in one knee, and in another case there was atrophy of the deltoid as a result of neuritis. The second group was a small one of five cases, also first attacks, but which did not come under treatment till they had been ill for over a month. Of these, four cases had already had prolonged salicylic treatment without benefit. With serum a cure was obtained, with an average duration of treatment of fifty-one days. Then comes a group of thirteen cases, representing second, third, and fourth attacks. With an average treatment of fifty-three days, eleven cures were obtained, and one case was cured as regards rheumatism, but a nephritis previously present persisted. The three groups contained in all forty-seven cases, giving forty-three complete cures and one partial cure. In three cases there remained a slight impairment of function.

The most favourable results were obtained in cases of chronic rheumatism which had developed from acute cases. In this class there were nine cases, which had existed for over five months, and eight of which had received prolonged salicylic treatment. With an average treatment of fifty-eight days, seven of these cases were cured, while the remaining two so far improved that they were able to resume work. Of two cases, presenting principally symptoms of neuritis, one was cured, one improved. The results were not so successful in eleven cases, which had been chronic from the beginning, and had already on an average persisted for two and a half years. Still, of these five were cured, two enabled to work, and the others somewhat improved, by a treatment of 113 days. Lastly, two cases of chronic chorea resulting from rheumatic fever were treated. The serum at first increased the movements, but then there was rapid improvement and cure in two months. The permanency of the results was very striking. Of the forty-seven acute cases Menzer was able to re-examine twenty-six, and of these only one, who had already had four attacks, had relapsed. Of the chronic cases sixteen presented themselves, and in every case the cure had been permanent, the patient remaining free from relapse for upwards of a year. The effect on endocarditis was interesting. Of the forty-seven acute cases twenty-three presented symptoms of endocarditis, and in fifteen cases an absolute cure was obtained, while six were left with a cardiac murmur, but without any functional disturbance.

The use of the serum converts a chronic inflammatory process into an acute form; thus, in pleurisy and pericarditis the effusion may be increased; similarly, an increase in the inflammatory exudation in cases of marked stenotic lesions may lead to serious results. Menzer, however, does not grant that endocarditis is necessarily a contra-indication to the use of the serum. Though occasionally the local lesion may be intensified, the effect is transitory. In chronic endocarditis the dosage must be very cautious. The only absolute contra-indications are chronic endocarditis, causing marked stenosis. At the acmé of pleuritic and pericardial effusions the serum should not be used, but later small doses may be used by experienced men, but not by those without considerable experience.

The dose is usually 5 c.c. in acute cases. In chronic cases it is well to treat the cases in stages. Single doses of 5 c.c. are injected at intervals of two to three days, and after the use of 30 c.c. a longer pause of one to several weeks is made, and then the injections are recommenced. To relieve pain in the affected joints, cold applications can be frequently applied, and, if necessary, morphia may be given, but of course salicylates are inadmissible. Under the serum treatment the appetite remains unimpaired. For the serum treatment Menzer claims that it is superior to other methods—(1) in that cases which have become chronic may be healed or ameliorated; (2) the healing processes are on the whole more favourable, and this applies especially to the endocarditis; (3) the danger of relapse is minimised.—*München. med. Wchnschr.*, 1904, No. 33.

ENESOL.

THE trade name enesol has been given to the salicyl-arseniate of mercury. It is a soluble salt of feeble toxicity and almost unirritating, so that it can be injected without causing pain. Breton used it on 400 occasions, and finds that injections into muscles are painless, but subcutaneous injection sometimes causes slight pain and formation of nodes. The dose employed was 0·03 to 0·06 grm., repeated every fifth, sixth, or eighth day. Patients in all stages of syphilis were treated, and the drug was well borne. The curative action is not so quick as with the biniodide, probably owing to the long intervals between the injections. The drug seems to have a special action on the nervous centres, especially the medulla. In the few cases where patients did not tolerate the drug it caused symptoms of cerebral excitement, sleeplessness, agitation, and alteration of character, tending towards violence. The biniodide did not produce the same symptoms in these patients. A marked aphrodisiac effect was noted in some cases, lasting for twenty-four hours after the injection. A man suffering from locomotor ataxia, who had had no erections for eight years, when receiving enesol had persistent erection, with emissions, lasting for five days, though the drug was only being given every sixth day. It would probably be well to use enesol with caution in cases of cerebral syphilis.—*Gaz. d. hôp.*, Paris, 1904, No. 79.

MEDICAL JURISPRUDENCE.

UNDER THE CHARGE OF

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Self-inflicted Avulsion of the Tongue—Recovery with Preservation of Speech.

Brouardel (*Ann. d. hyg.*, Paris, 1904, August) records the following unique case of self-inflicted injury:—A Paris policeman brought his wife, one morning, to the Tenon Hospital, along with her tongue, which he carried in a pocket-handkerchief. He stated that on his return home the previous day he found his wife up and attending to her household duties. She informed him that during the day she had had a violent attack of "nerves," and that in order to obtain relief from a feeling of suffocation she had put her hand down her throat and torn out her tongue. The organ was lying on a table by her side. Only slight hæmorrhage followed the act. The doctor who examined her at the hospital found that the wound presented a regular surface, and that the whole tongue, from a plane posterior to the tonsils and at the level of the upper border of the epiglottis, had been torn away. The patient was able to speak, making herself quite well understood, and suffered very little inconvenience during mastication. She made a rapid recovery.

Poisoning by Bichromate of Potassium.

Lohr records a case of poisoning with the above salt, which has a special interest, from the success which attended the treatment by means of nitrite of silver, as recommended by von Jaksch, and also from the development of a glycosuria in the patient. A woman, æt. 42, took with suicidal intent two to three tablespoonfuls of a fluid used for filling electrical batteries, and which consisted of a concentrated solution of bichromate of potassium acidified with sulphuric acid. The patient at once began to vomit, and suffered from violent burning pain in the region of the stomach. On removal to the hospital, two hours later, she was quite conscious, with a good pulse, and complained chiefly of the burning pain. Her tongue was covered with a brownish-red coating, but there was no corrosion of the mucous membrane of the lips or mouth. The stomach was washed out at first with 40 litres of distilled water, while a 1 per cent. solution of nitrite of silver was being prepared, with 8 litres of which the stomach was then again washed out. White of egg was then administered, but vomiting caused very little of this to be retained. Serious symptoms of collapse set in about an hour after the above treatment, necessitating injections of camphorated oil and saline solution. The blood showed a polynuclear neutrophile leucocytosis. The following day there was albumin and sugar in the urine. The latter was present in the urine for three days, and then disappeared. The patient made a rapid recovery, which Lohr attributes to the efficacy of the treatment by washing out the stomach with a 1 per cent. solution of nitrite of silver, as recommended by von Jaksch. Silver nitrite forms the insoluble chromate of silver with chromic acid and its salts.—*Berl. klin. Wchnschr.*, 1904, July 11.

Homicide by Picrotoxin Poisoning.

Most books on toxicology refer to the fact that cocculus indicus is stated sometimes to have been introduced into beer in this country by low-class publicans, in order to increase its reputation for alcoholic potency. If such adulteration did occur, it has long since ceased, except apparently in certain parts of America. Carel states that during the last three years he has thrice isolated picrotoxin from the human body, in cases in which it had been introduced by saloon-keepers into the liquor of half-drunken men, for the purpose of robbery. He alleges that the substance is largely purchased by saloon-keepers in the northern counties of Minnesota, the crystals of picrotoxin, or a decoction of cocculus indicus berries from which it is derived, being added to the drink of the desired victim. The result is to produce a helpless state of semi-conscious inebriation, which renders robbery easy. Sometimes, however, an overdose is given, and the man dies, as in the cases now recorded. Carel points out that the general effects of the picrotoxin and alcohol combined closely resemble the external symptoms of alcohol alone, and this similarity of symptoms, together with the absence of characteristic post-mortem appearances, causes many deaths to be attributed to "accident" and acute alcoholism, which in reality are due to picrotoxin poisoning. In one of Carel's cases, the man took three glasses of beer and shortly afterwards dropped down dead. From 132·5 grms. of the stomach and contents, 0·1025 grms. of well-defined crystals of picrotoxin was obtained, and 0·925 grms. from 50 grms. of the liver. In another case the symptoms were those of intensified intoxication, with an almost complete loss of voluntary power. The author is inclined to think that the presence of alcohol influences the usual character of the symptoms produced by the drug, which are similar to those caused by strychnine, but in the cases he refers to were chiefly characterised by complete loss of control over the voluntary muscles.—*Merck's Arch.*, N. Y., 1904, July.

THE MEDICO-LEGAL INSTITUTE OF THE UNIVERSITY OF PARIS.

A YEAR ago a new departure was made by the University of Paris, by the creation of a Medico-Legal Institute and the foundation of a diploma in legal medicine. This is the only instance, so far as we are aware, of a special diploma connected with this branch of medicine, and the fact may be taken as a recognition by our neighbours of the importance and necessity of special study and experience in order to qualify medical men to undertake the duties which devolve upon them in connection with the administration of justice in civil as well as in criminal courts. The diploma is open to foreign graduates, and may be obtained by attendance at two out of the three sessions or semesters which are held during the year, and by passing the required examination. The course of study comprises lectures and thoroughly practical instruction in forensic medicine and medico-legal psychiatry, for which Paris affords unrivalled material and facilities. In an interesting report upon the work of the Institute last year, Brouardel states that there were 144 lectures, 212 practical demonstrations, ninety-five autopsies made before or by the students themselves, while 250 cases of insanity were examined, and reports made in fifty instances of accident to work-people. The teaching staff includes the names of such men as Descoust, Vibert, Ogier, Joffroy, Garnier, and others, in addition to that of Brouardel, so that there can be as little doubt of the future success of the Institute as of the great influence which it will exert upon the study and progress of medical jurisprudence.—*Ann. d. hyg.*, Paris, 1904, July.

A NEW METHOD FOR THE DETECTION OF PHOSPHORUS IN CASES OF POISONING.

IN 1900, Binda published a new method for detecting phosphorus in the contents of the stomach in cases of poisoning. It consisted in the following processes:—(1) The detection of phosphorescence by the naked eye in a test tube, and then by means of the microscope. (2) Detection of the presence of phosphorus by means of its characteristic reactions with nitrite of silver, chloride of gold, molybdate of ammonium, and bisulphide of carbon, and the microscopic examination of the precipitates thus obtained. (3) The production of a green flame. Stoenesco of Bucharest, in view of the fact that the processes at present in use for detecting phosphorus in cases of poisoning, including those of Mitscherlich, Scherer, Fresenius, Blondlot, and others, are complicated and uncertain, especially when the quantity of phosphorus present is small, and a considerable time has elapsed after it was taken, has carried out an investigation into the value and accuracy of Binda's method. His experiments were performed on dogs, which he poisoned by introducing phosphorus into their stomachs. When the animals died, or were killed some days after the administration of the poison, the contents of the stomach were examined according to Binda's method, in the following manner. Two drops of the stomach contents were introduced by means of a glass rod into a test tube, the upper half of which was then heated in a flame, and immediately—in a dark chamber—luminous vapour was seen to rise from the bottom of the tube. On placing a drop of the contents on a glass slide, and examining it under the microscope, minute shining or phosphorescent particles surrounded by a nebulous vapour could be seen. One proof that these particles really consisted of phosphorus was afforded by examining them micro-chemically. To the same drop above referred to was added, on one side of it, a little nitrate of silver, and on the other side molybdate of ammonium. The slide was now slightly heated over a spirit lamp and at once examined under the microscope. It was then seen that the particles which had appeared to be phosphorescent gradually became, in some cases black, while in others the fragments were transformed into acicular crystals of a pale yellow colour. Stoenesco was not able to verify the production of a green flame, as mentioned by Binda, when the contents of the stomach, or precipitates containing phosphorus, were burnt in the flame of a spirit lamp; but he is fully satisfied that in other respects the method is more reliable than any of the other processes for the detection of phosphorus at present in use. It also possesses the additional advantages of being easily and quickly carried out, and requires no special apparatus; while, at the same time, it is a very delicate test, which can be performed by any medical man without the aid of an expert chemist.—*Ann. d. hyg.*, Paris, 1904, June.

DERMATOLOGY.

UNDER THE CHARGE OF

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THE VISCERAL CRISES IN THE ERYTHEMA GROUP OF SKIN DISEASES.

OSLER (*Am. Journ. Med. Sc.*, Phila., 1904, May) has already on more than one occasion directed attention to various visceral complications which may occur in the course of attacks of cutaneous affections, including examples of erythema, urticaria, and purpura. He now alludes to the possibility of mistaking these visceral crises for appendicitis or intussusception or obstruction of the bowel, and handing over the patient to the surgeon for operation, as being by no means remote. Thus in one of his series one attack was unilateral, and of such severity that the physician who was called in, knowing nothing of the previous history of the case, diagnosed renal colic. The association of the colic with the passage of blood per rectum may, of course, lead to the diagnosis of intussusception. In another instance, a child was admitted to the surgical wards supposed to have appendicitis. Fortunately, the skin rash was noticed, the pain subsided, and he was transferred to the medical side. Three cases are related in which laparotomy was performed, and he draws the following practical lessons. First, that in children with colic, the greatest care should be taken to get a full history, which may bring out the fact of previous attacks, either of skin lesions, of arthritis, or of intestinal crises; and, secondly, to make the most careful inspection of the skin for angioneurotic œdema, purpura, or erythema. It is to be borne in mind that recurring colic may be for many years the sole symptom or feature of this remarkable disease. Colic is the most constant one, is due to infiltration of the intestinal wall with blood and serum, yet it is, so far as he knows, never dangerous.

COCAINE AND ADRENALIN.

THE local application of drugs to allay pain in operations is as old as medicine itself, and physicians have striven to discover methods of bringing their remedies in contact with the peripheral sensory nerves with that end. Through the entire history of local anæsthesia, from antiquity to recent times, runs the erroneous impression to extend the sleep-inducing, narcotic influence of substances to the locality of their application. A new era began with the introduction of cocaine by Keller in 1884, which possesses powerful local anæsthetic properties apart from narcotic ones. Schleich proved that very dilute solutions of cocaine, with the addition of common salt, if made to infiltrate the tissues copiously, even to the production of an artificial œdema, were sufficient to occasion local anæsthesia, and Braun discovered that the best vehicle was a 0·8 to 0·9 per cent. solution of chloride of sodium-normal saline. Other more recently introduced substances, as eucain-β and tropacocaine, cannot completely replace cocaine. Braun has taken up the whole question (*Berl. klin. Wchnschr.*, Berlin, 1904, Jan.), and has made a most valuable contribution to its literature. The hitherto known local anæsthetics are all protoplasm poisons, which have a remarkable affinity for all kinds of protoplasm with which they come in contact. They occasion, in the place where they are applied, a local toxic action, and if in sufficient amount and enter the circulation quickly enough, a general one. It is thus clear that the toxic effect of such a substance must be the more intense the more rapidly and completely it is absorbed, but at the same time the feebler the local poisonous effect at the point of application. Conversely, the more intense the local poisoning, the slower it is absorbed, since it has more opportunity to permeate the tissues. Corning suggested in 1885 the employment of measures of compression to interrupt the blood supply, and another method is to reduce the temperature of the part by the ether or chloride of ethyl spray. In the human subject a continuous period of one to two minutes of application of the spray suffices greatly to intensify the local anæsthetic effect of a dilute solution of cocaine, and, simultaneously, the duration of anæsthesia is much prolonged. A new ally has been found in adrenalin. It has been established that the addition of very small quantities of adrenalin enormously enhances the anæsthetic effect of solutions of cocaine, areas far beyond the region of direct infiltration are rendered insensitive, and this lasts even for hours. This, there is no doubt, is produced by the lowering of the vitality of the tissues, in consequence of the transient but almost complete anæmia induced by the adrenalin, combined with the delay in absorption. Braun relates fully the various steps by which he advanced to a correct estimate of the best and safest method of using the combination. As a general rule, a solution of cocaine of a strength of 0·01 to 0·05 per cent. to 100 c.c., to which from 3 to 5 drops of a 1 in 1000 solution of adrenalin has been added, is a useful and safe strength. The vehicle is a solution of chloride of sodium of not less proportion than 0·6 per cent. It is not necessary to infiltrate the field of operation itself, but only the tissues in its immediate neighbourhood, which contain the supplying nerve trunks. In particular-inflamed tissues ought never to be infiltrated. It is a conduction anæsthesia and not an infiltration anæsthesia of the affected tissues which is desiderated. If possible, the field of operation should be thoroughly cut off from the sensitive sphere by a primary injection of selected points, the deepest part being first attacked. Local anæsthesia of every region of the body has benefited by the introduction of adrenalin. The new ally deserves a cordial greeting, "yet the friendship must be calm and prudent, lest the friend turn into an enemy."

BLASTOMYCETIC DERMATITIS.

T. CASPAR GILCHRIST (*Journ. Cutan. Dis. inc. Syph.*, N.Y., 1904, March) relates eight instances of recent occurrence of this disease. One in particular was interesting, as the lesions were so typical, and are almost for the first time represented on a coloured plate. The skin disease began seven months before on the right wrist of this man, as a pea-sized hard lump or nodule, which could be picked up and rolled between the finger and thumb. It was dull red in hue, and gradually increased in size for five weeks before it broke down and exuded pus. It then became markedly papillomatous, and pus could be squeezed from between the projections. He got into the habit of pressing this out a number of times a day, and he noticed that less and less pustular exudate followed this mode of treatment, with the consequent healing up of the patch, so that in four or five months it had disappeared, with practically no scarring. Other lesions made their appearance, so that when he came to Gilchrist for treatment there were as many as sixteen on the face and neck. There were no enlarged glands. A sickly odour exhales from the patches, and they throb and burn when the pus is allowed to accumulate in them. The pus is apt to form dirty brown black scabs in the centre from drying up. Much relief follows the squeezing of the patches. Itching is also complained of. The pus treated with liq. potassæ showed a few double contoured budding refractive bodies, containing granules of various sizes in their protoplasm. Cultures on agar at room temperature produced fine aërial hyphæ with terminal tufts. Excised portions showed marked hypertrophy of the epidermis with miliary abscesses scattered here and there, attempts at formation of pseudo-tubercles in the corium, large numbers of plasma cells. The patient got quite well with the application of the X-rays and the administration of iodide of potass internally. The blood from another case in a negro had the power of agglutinating a pure culture of the organism derived from the first case.

THE TREATMENT OF ARTIFICIAL DERMATITIS BY DECHLORURATION.

RAVAUT (*Gaz. d. hôp.*, Paris, 1904, 26th April), encouraged by the happy results obtained by Widal and Javal in cases of œdema in Bright's disease, by diminishing the chlorides ingested, has applied the plan to the treatment of certain skin affections having for their chief characteristics dermo-epidermic exudation, with or without serous oozing and the formation of crusts. He took as the type an artificial dermatitis in a washerwoman, with eczematous lesions, weeping, very pruriginous, occurring on the hands, forearms, and thighs, and associated with marked serous infiltration of the subcutaneous cellular tissue. Ordinary methods of relief having failed, and having assured himself that she had no visceral defect, nor any pronounced symptoms of renal insufficiency, she was submitted to a régime from which the chlorides were eliminated. During the first few days the lesions underwent no modification, the urinary chlorides alone progressively diminishing. On the third day the pruritus lessened, on the fifth the oozing, while the skin no longer pitted on pressure. By the tenth day the surface was scaly, the redness greatly reduced, and her condition very much improved. As a counter test, to prove the hurtful influence of chloride of sodium, half an ounce in cachet was administered daily. For the first four days she experienced no annoyance, though the amount of chlorides in the urine progressively increased and her weight went up, but on the fifth day fresh itching of an intense kind arose; she scratched, the skin became infiltrated afresh, and poured forth a glutinous fluid, and slight œdema of the lower limbs asserted itself. The supplementary chloride was then reduced to 2 drms., and next day withdrawn entirely; consentaneously with this, the œdema, the pruritus, and the discharge of serosity ceased. It remains to be determined what skin affections are appropriate for this mode of treatment, and how far the results are permanent.

ACUTE INFECTIOUS PEMPHIGUS IN A BUTCHER, DURING AN EPIDEMIC OF FOOT AND MOUTH DISEASE, WITH A CONSIDERATION OF THE POSSIBLE RELATIONSHIP OF THE TWO AFFECTIONS.

THERE have now been recorded, notably by Pernet, but also by others, a considerable number of instances of acute pemphigus, apparently arising from a poison of animal origin. Bowen has again directed attention to this subject, and has shown that no doubt can remain, that there exists an acute, febrile form of bullous dermatitis, caused by the infection of a wound, and occurring usually, if not always, in butchers or people who have to do with animal products. In some of the cases there were hæmorrhagic bullæ, while the mouth, palate, eyes, and nostrils were almost always more or less involved, and the eruption, when fully developed, gave rise, in general, to an intense fœtor. Furthermore, that this disease runs a rapid course, and that the mortality is very high. It is interesting to compare with these cases of infectious pemphigus, a series of acute bullous dermatitis following vaccination that appeared in Boston in 1902. Of these, six out of ten reported by Howe, died. In these also the mucous membrane of the mouth and throat was much implicated, swallowing being impossible on account of the bullæ and ulcers in those situations. The two series of cases seem related, and may have a common etiology. The example recorded by Bowen happened during an epidemic of foot and mouth disease,—a contagious febrile disorder associated with vesicles, succeeded by ulcers on the mouth, lips, cheeks, and tongue. Infection to man may take place through an abrasion of the skin, as in milking or slaughtering diseased animals, the eruption first manifesting itself on the place where the poison has entered. Here and there cases that have been considered foot and mouth disease in man, run an acute, infectious, and often fatal course. The symptoms in some of these resemble closely those present in the acute pemphigus of butchers and in the epidemic reported by Howe. An important fact, brought out during the summer of 1903, may indicate a possible etiological relationship between foot and mouth disease of animals and these severe infectious forms of bullous dermatitis in man. An outbreak of foot and mouth disease arose in the town of Wakefield, as the result of some experiments made by Dr. Tyzzer of Harvard upon calves, in the study of vaccinia. Three calves, inoculated with virus obtained from a vaccine establishment, developed vaccine lesions, but sickened and died in four or five days. Two other calves, which had not been vaccinated, but which had been kept in the same stable, died with similar symptoms a few days later. Twelve days after the death of the last calf, four cows kept in a stable below, began to show lesions of the tongue and mouth, and subsequently vesicles developed on the feet. Control experiments were then instituted, in a specially selected barn in another town, the same virus being employed. The vaccinia lesions developed in the usual manner, except that on the fourth day bullæ appeared on the inner border of the vaccine lesions of the lip in all three calves. The fluid from these bullæ, when rubbed into the mouth of the cow, produced typical symptoms of foot and mouth disease, and this was carried to two other cows in the same barn which were not inoculated. Tyzzer concludes that, after these experiments, there is no question that the disease originated from the vaccine lymph used in the inoculation. There was reason for the assumption that the outbreak of foot and mouth disease was started by the inoculation of impure vaccine virus, possibly imported from some European country where the former is prevalent, in some fresh virus brought over to renovate a product that was losing its vitality. There is at least sufficient resemblance between foot and mouth disease and acute pemphigus to warrant the belief that they belong to the same group of affections, and that they may possibly be allied.—*Journ. Cutan. Dis. inc. Syph.*, N.Y., June, 1904.

DISEASES OF CHILDREN.

UNDER THE CHARGE OF

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RELATION OF THE STATUS LYMPHATICUS TO SUDDEN DEATH.

THE views set forth in this paper (George Blumer, *Johns Hopkins Med. Bull.*, Baltimore, 1903, October) are based upon the observations in nine cases of sudden death in children, and on a study of the literature of the subject. Regarding the question as to whether a diagnosis can be made of the conditions before the onset of the fatal attack, Escherich maintains that such patients have a pale, thin skin, pasty complexion, pads of subcutaneous fat, and often present signs of rickets and scrofula. The superficial lymph nodes, especially those of the neck and axilla, are enlarged, there is hypertrophy of the tonsils and spleen, and adenoids are present. A percussible thymus may develop later, and there is an increase in the number of lymphocytes present. The immediate causes of death are cardiac paralysis and asphyxia. Many of the infants found dead in bed, and supposed to have been overlain, belong to this class of cases. The pathology of the condition is, broadly, a hyperplasia of the thymus, and other lymph tissues over the body, and there may be a lymphoid condition of the bone marrow, and occasionally an enlarged thyroid gland. Microscopically the lesions are generally hyperplastic, along with slight degenerative changes in the proliferated cells composing the germinal centres. Bacteria do not seem to play any part in the causation of the condition.

The author concludes as follows :—(1) Status lymphaticus is a definite pathological entity. (2) It is probably associated with, if not due to, a condition of intermittent lympho-toxæmia. (3) It may be associated with sudden death as a result of lympho-toxæmia alone in some cases, or as the result of the action of toxic, physical, or psychical injuries, which are rendered much more powerful than usual by the predisposing action of lympho-toxæmia. (4) In some cases the sudden death is due to asphyxia, from pressure of the enlarged thymus on the trachea. (5) Subjects of the status lymphaticus can be recognised clinically in some cases.

KERNIG'S SIGN.

THE following is a very brief summary of an interesting paper by Miller of Chicago, in the *Am. Journ. Med. Sc.*, Phila., 1904, June, on the value of Kernig's sign in diseased conditions of the nervous system in childhood :—

(1) The sign is present in a large percentage of cases of meningitis; it is, however, not constant, may be transitory, or only appear late; therefore daily examinations should be made for its presence. (2) It is

present in a typical manner occasionally in a number of widely different diseased conditions, and for this reason it is probable that there is not a uniform cause for the sign. (3) The sign is occasionally unilateral, exclusive of cases of hemiplegia or local trouble, which might explain its presence. (4) The presence of the sign in cases of suspected meningitis is merely another factor favouring the diagnosis. Its absence, especially early, is not infrequent, and should not be allowed to outweigh the positive findings. (5) A maximum angle of 115° gives more valuable results than does an angle of 135°, as proposed by Kernig. (6) The angle obtained in any individual case depends in part upon the force used in extending the legs, and for this reason actual measuring of the angle is not essential.

INFANTILE TUBERCULOSIS.

AT a discussion on this subject which took place recently at the N.Y. Acad. of Med., there was no doubt in the minds of those taking part in the debate that congenital tuberculosis was very common. Sabine, from a perusal of the literature of the subject, had come to the conclusion that, while there are many cases reported in which tuberculosis is present in children prior to birth, there is an absence of clinical evidence to prove an infection from the father, but that maternal infection was an established fact. In considering postnatal types, he believes that the chief portal of entrance is the tonsils. Freeman stated that in 1448 successive autopsies at the Foundling Hospital, 158, or nearly 11 per cent., showed tuberculous disease, which is a much lower percentage than given by other writers. He considers that tuberculosis in infancy arises usually from either the respiratory or alimentary tract, but the comparative frequency of those two modes of infection has not been determined. The tuberculosis of early life is most common during the first year, when children are on an exclusive milk diet; much milk contains tubercle bacilli, and bovine bacilli are pathogenic for man. At this period, owing to the structure of the intestinal wall, bacteria can probably pass through it, although it is uninjured. Experiments on animals show that inhalation tuberculosis causes usually lesions of the bronchial lymph nodes and lung alone; wherever the portal of entry may be, these structures are early involved. Inoculation experiments prove that mesenteric lymph nodes may be tuberculous without the presence of gross lesions. Mesenteric or intestinal lesions can be detected on gross examination in about 26 per cent. of those examined post-mortem. The tuberculosis of infancy, unlike that of later life, is usually an acute, widely disseminated, general disease, with moderate temperature, and few symptoms or physical signs, unless the invasion of the meninges gives rise to symptoms. Tuberculosis of the cervical lymph nodes, and of the joints, is rarely seen under the third year. The power to overcome a tuberculous infection that has invaded the organs does not apparently exist in infancy.—*Arch. Pediat.*, N. Y., 1904, June.

CLINICAL FEATURES OF EPIDEMIC CEREBRO-SPINAL MENINGITIS.

KOPLIK, in the *Med. News*, N. Y., 1904, July, gives his experience of seventy-seven cases of meningitis, in which thirty-five were of the tuberculous type and thirty-seven were caused by the *Meningococcus intracellularis.* He regards an abrupt onset as specially symptomatic of the epidemic type, and as one of the most important means of differentiating it from the other forms of meningitis. He places a high value on the presence of Babinski reflex as a sign of tuberculous meningitis, as it was present in 77 per cent. of these cases and in only 16 per cent. of the epidemic form. He does not consider Kernig's sign as a symptom of much importance in the diagnosis of any form of meningitis. Facial palsy was present in more than half of the tuberculous cases, and very rarely in the epidemic type. Opisthotonus occurred in 60 per cent. of the cases of both varieties. M'Ewen's sign, which depends upon the distension of the lateral ventricles with fluid, was naturally more often elicited in the tuberculous variety of the disease, in which effusion into the ventricles takes place both much more readily and also earlier. The temperature charts exhibited the greatest irregularities, and could not be depended upon as aids to diagnosis. An ophthalmoscopic examination revealed no changes in the majority of the cases examined in the epidemic type, while in 77 per cent. of the tuberculous cases optic neuritis or tubercle of the choroid were present. A leucocyte count was made in every case, and in all those of the epidemic form a certain amount of leucocytosis was present. The greatest variation was found in the character of the cerebro-spinal fluid obtained by lumbar puncture. In the epidemic variety the fluid is rarely purulent, usually cloudy, but may be clear, especially in chronic cases. The cloudy fluid is the most favourable fluid from which to obtain diplococci, either by smear or by culture. On the other hand, the fluid in 72 per cent. of the tuberculous cases was quite clear. The mortality of the thirty-seven cases of epidemic cerebro-spinal meningitis was 35·6 per cent. Koplik does not consider lumbar puncture curative, but thinks it is indicated for purposes of diagnosis for frequent rigors, high temperature, stupor, constant headache, and delirium.

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EDITORIAL.

Lunacy in Scotland.

THE annual reports of the Commissioners in Lunacy for Scotland are always interesting and suggestive reading to those who have any special relation to the important subject with which they deal. It would be well, indeed, if they were read by every medical man in the country, and by all who take a real interest in its social condition. Happily there are signs that the number of the latter is steadily on the increase, and for many reasons it is to be hoped this will show a steady growth. The Commissioners' report for the year 1903 does not disappoint expectations. It is fully as interesting and instructive as any of its predecessors.

The outstanding fact in the lunacy statistics of the year is the striking diminution in the hitherto steady yearly increase of the pauper insane, and of the surplus of admissions over removals and deaths. This is a most gratifying fact, whether it be the commencement of a really settled tendency, or only a temporary ebb. The average annual increase of pauper patients has not been so low for nineteen years as it was last year. As regards the districts which chiefly contribute to this increase, these are found to be the counties of Edinburgh, Aberdeen, and Renfrew. The county which has the largest actual decrease is Forfar, but Lanark, Linlithgow, Dumbarton, and Selkirk also show a decided fall. The causes of this difference in counties are probably exceedingly complex, but if they could be definitely ascertained, the knowledge would be of the greatest interest and value. Curiously enough, while the condition of matters as regards pauper lunatics is as stated, the contrary is the case with respect to private patients, whose numbers show a very decided increase. The Commissioners have gone further than merely to record the fact of an increase, and have made inquiries with reference to one particular asylum which contributed very largely to this increase. They have found that a considerable proportion of the private patients admitted to it have come from the same class as that to which the majority of pauper patients belong. This is a gratifying proof that, where reasonable facilities are given for the treatment of private patients at low rates of board, there is a willingness on the part of the working-class population of Scotland to avail itself of them and so avoid seeking parochial relief. It should be stated that the increase in number of private patients does not counterbalance the diminution in the average annual increase of pauper patients, but that both together show this diminution. It would have been interesting, though admittedly a matter of some difficulty, to compare the different counties of Scotland with respect to the increase of private patients, and to see whether this increase was in unison with or opposed to the statistics of the counties as regards the changes in the number of the pauper insane.

Besides the usual inquiries into the statistics for the year of Scotland as a whole, the Commissioners discuss some very important questions upon which they have obtained special information. One of these has reference to the amount of land which can be satisfactorily made use of for the employment of patients in farm work. The conclusions drawn are based on a very thorough and careful investigation of the information obtained, and will be of great use, not only, we should suppose, to the Commissioners themselves, but to Lunacy Boards and Medical Superintendents, when a new asylum is being built, or an old one extended. The chief conclusion is that half an acre per patient is the maximum of arable land which can usefully form a field for the employment of patients in agricultural work of the usual kind.

Another most interesting inquiry refers to the possible causes of the striking difference which has existed over a long period between the neighbouring parishes of North and South Uist, so far as their lunacy statistics are concerned. At the present time the former shows a much larger proportion of lunatics than the latter, and the increase which has occurred in both parishes during the last twenty-three years is also more marked in the former. The influence of migration from the two parishes is investigated, to see if this can throw any light on the problem. The statistics show that North Uist has suffered the greater drain on its population, and that the loss is greater in the case of the male sex. The difference, however, is not considered sufficiently great to account for the unfavourable position of the northern parish. The question of infantile death-rate is next discussed, and it is shown that in this respect North Uist compares the more favourably. From this and other facts previously obtained in other districts, the conclusion is drawn that a low mortality in children is associated with a high rate of imbecility. This conclusion is also confirmed by statistics. But it is not possible to make the same deduction as to the association of the rate of infantile mortality with the prevalence of general insanity. Though the discussion does not lead to a complete solution of the problem, it would, as the report states, be more likely to do so were the information more minute and exact and obtained on the spot. It is to be hoped that one or more of the Commissioners may have the time and opportunity to carry on the investigation in this more solid manner, and that a complete explanation may be forthcoming of the problem which has already engaged their attention. The result would not only be satisfactory so far as the two parishes are concerned, but would almost certainly be of service in tracing the causes of insanity in the country generally.

Various other matters are passed under review, and all are treated with the vigour and clearness apparent in those to which attention has been directed. It is to be hoped that the members of Lunacy Boards in Scotland will read with care the useful information prepared for them by the Commissioners.

Mrs. Bishop.

THE death of Mrs. Bishop has an especial interest for the medical profession, and concerns Edinburgh in a very direct manner, for not only was she the widow of a well-known Edinburgh practitioner, but much of her sympathy was concerned with the establishment of medical missions. Isabella Bird, to use the name by which she first became known to the reading world, also presented, for the interest of the physician, many characteristics of a physical type which can hardly be considered as common. To the lay mind, Mrs. Bishop was indeed, if not a mass of physical contradictions, yet very much of an anachronism. It was difficult for it to comprehend how a woman, who in the quiet of her home life seemed so fragile, sensitive, and dependent, could possibly submit to or even survive the experiences of her multitudinous travels. The Invalid at Home and the Samson Abroad do not form a very usual combination, yet in the case of the famous traveller these two ran in tandem for many years. Mrs. Bishop was indeed one of those subjects who are dependent to the last degree upon their environment to bring out their possibilities. It is not a question of dual personality, it is the varied response of a single personality under varied conditions. Of course the response can only be maintained in an active environment, when there is a large storehouse of energy behind it all, for no woman can travel some 2400 miles through a wild and untamed country, that had not even caught the echoes of the social trumpet, without having a basis of strength of an unusual kind. And yet despite this fact, there is much to be wondered at in the physical history of Mrs. Bishop. When she took the stage as pioneer and traveller, she laughed at fatigue, she was indifferent to the terrors of danger, she was careless of what a day might bring forth in the matter of food; but, stepping from the boards into the wings of life, she immediately became the invalid, the timorous, delicate, gentle-voiced woman that we associate with the Mrs. Bishop of Edinburgh.

Rest and Exercise.

IN the majority of cases we would be prepared to doubt the wisdom of any system that was founded on the method as practised by Mrs. Bishop. Regular exercise in proportion to the capacity of the individual seems the rule, and any departure from it likely to promise unfortunate results. We have seen much disaster follow the straining of untried physiques, and to this day much insanity is rife amongst the "general" in regard to the spending of the annual holiday of a month or a fortnight in the country. But we have known many cases where men, indifferent to any systematic exercise during ten months of the year, were able to do their eight hours' walking over moor and hill on the 12th of August, and not be conscious of anything but good results. The languid man of the city is often the keenest and most enduring sportsman on the hills; the most difficult of gourmets the man who makes the best rough-feeder, if necessity demand. A delicate girl who complains of fatigue after walking half a mile in the open, will dance ten miles in a heated atmosphere without "turning a hair." The fact is, that it is only on rare occasions that the word "can" is added to the word "will," and it is only under special environment that special possibilities develop involuntarily. The principle is of universal application physically, morally, and intellectually. The influence of environment on character has, it may be remarked, led to an enormous amount of quasi-scientific twaddle about dual personality and the like.

Holiday Lunatics.

CANNOT something more systematic be done to impress upon the people of this country the main principles to be observed, from the standpoint of health, in the conduct of holidays? There are many people, especially south of the Tweed, who seem to imagine that a sunburned face is an indication of health, and a preparation enough for the work of the winter. It is a pitiable sight to see hundreds of evidently sane individuals, at such a place as Folkestone, basking in the full blaze of the sun in the very heat of the day, influenced solely by the insane desire, on their return to the cities, to impress their friends with the redness or the brownness of their skins. The whole concern seems on a par with many mad competitions that from time to time afflict mankind, and make us doubt the stability of social sanity. A sun bath, taken in moderation, is an excellent thing, but to expose one's head and spine for hours daily to the fiery rays of a July sun, when the temperature ranges from 80° to 90° in the shade, surely spells madness. A sunburnt face is a picturesque thing enough, but people must be taught that the true colour of health comes from within, not from without, and that the basis of all physical sanity rests on the Aristotelian mean, "All extremes are wrong." There is another form of holiday insanity which principally affects the lower order, and which shows itself in the expressed notion that an excursion to Rothesay and back in one day, starting, say, from some small village in Forfarshire, can in itself constitute a holiday. We have before us now the advertisement of an excursion, timed to leave Carnoustie at 5 A.M. and to return at 1 A.M. the following morning. Of these twenty hours, twelve are to be spent in crowded railway carriages. It needs little imagination to picture what that means. It means rather an unholy day than a holiday. Britons not only take their pleasures sadly, but madly.

Science and Immortality. It is probable that on receiving Professor Osler's little work, entitled "Science and Immortality," the reader will be inclined to say to himself, "Is Saul also among the prophets?" Whatever answer may be given to such a query, there can be no doubt that in his acceptance of the Ingersoll Lectureship Dr. Osler has given one of the most interesting of the many addresses which he has delivered. "To attempt to say anything on immortality seems presumptuous—a subject on which everything possible has been said before, and so well said, not only by the master minds of the race, but by the many, far wiser than I, who have spoken from this place. But, having declined the honour once, and having learnt from Professor Eliot that others of my profession had also declined, when a second invitation came it seemed ungracious, even cowardly, not to accept, though at the present moment, before so distinguished an audience, I cannot but envy the discretion of my friends, and with such a task ahead I feel as Childe Roland must have felt before the Dark Tower." Such is Professor Osler's reason for acceding to the request of the University of Harvard that he should deliver the lecture this year.

In grouping the views of modern mankind upon the subject of Immortality, he divides them into the old triple classification—the Laodiceans, who, while accepting a belief in Immortality and conforming to the observances of the prevailing religion, live practically uninfluenced by it; the Gallionians, who put the supernatural altogether out of man's life, as a matter about which nothing can be known; and the Teresians, who lay hold upon eternal life with the anchor of faith, as the controlling influence in this life. In unfolding his subject and discussing its varied relations, Professor Osler was in his happiest vein. With wide excursions into every branch of knowledge that can be brought to bear upon the all-important question with which he was called upon to deal, he kept the main purpose of the lecture steadily in view, and manfully made an attempt to grapple with its profound significance. The conclusion of the whole matter from the point of view of the eloquent orator who has delivered the last Ingersoll Lecture, is found in one of his concluding sentences:—"Some of you will wander through all phases, to come at last, I trust, to the opinion of Cicero, who had rather be mistaken with Plato than in the right with those who deny altogether the life after death; and this is my own *confessio fidei.*"

L'Entente Cordiale. It was a happy inspiration on the part of our London brethren to invite the distinguished French physicians and surgeons who met in London last month. Although undoubtedly, between the medical and scientific men on both sides of the Channel, most cordial relations have long existed, yet it was of interest to find that so many representative men were willing to take part in a gathering demonstrating beyond a doubt how warm is the appreciation of French and English scientific men for each other. During the visit of our French colleagues, the hospitals, laboratories, and museums were thrown open on every hand to receive the visitors, and they were welcomed by representative men at every one which they visited. It cannot be doubted that the inspection of these institutions by foreign guests served a twofold purpose. On the one hand, it showed the visitors how matters of this kind are managed in London, while, on the other hand, it gave criticism and suggestion an opportunity of bearing fruit in this country. The original intention was the promotion of good feeling between the two neighbouring nations, but it is probable that the results of the gathering will be much more far-reaching in importance. The banquet which brought the visit of our guests to its culmination was one of the most interesting dinners of recent times. The speeches of Sir William Broadbent, Dr. Pye-Smith, and Dr. George Ogilvie on the one side, and of M. Huchard, M. Chauffard, M. Lucas-Championnière, M. Poirier, and M. Triboulet on the other, were characterised by the utmost cordiality and warmth. The general feeling was excellently summed up in the eloquent words of Sir William Broadbent, who presided, when he proposed the toast of "Welcome and Au Revoir."

The Late Dr. Russell.

ON the eve of going to press, we have learnt of the death of Dr. James Burn Russell, Medical Member of the Scottish Local Government Board. Although it was known that his health had been causing anxiety to his friends, it was yet hoped that he might be restored to such a measure of strength as would allow him to continue his duties in connection with his important office. This, however, was not to be. From the year 1865, when he became Superintendent of the Fever Hospital in Glasgow, he has been identified with Public Health, and for more than a quarter of a century he was Medical Officer of Health for the City of Glasgow. In this position he did an enormous amount of work in sanitary administration and in scientific hygiene. His strenuous endeavours were recognised by his University, which created him LL.D.; by the British Medical Association, which awarded him the Stewart Prize; and by the Royal College of Physicians, which conferred on him the Bisset Hawkins Memorial Medal. When a vacancy occurred in the office of Medical Member of the Local Government Board for Scotland, it was natural that he should be asked to fill it, and he has done so during the last six years with universal acceptance.

Municipal Shortcomings. EVERYONE who is interested in Municipal Government will do well to read the series of short articles which appeared first of all in the *Liverpool Journal of Commerce*, and have since been issued as a small volume, from the pen of Mr. Myddelton Shallcross. They form a strong indictment against the Corporation of Liverpool primarily, but secondarily against the citizens, for their failure to grasp and deal intelligently with the many problems which vitally affect the health of the community, and which are the cause of much preventible mortality. We have read the whole of the twenty-five short articles with the greatest interest, and with a constantly growing conviction that the truth and force of the author's contentions are as applicable to other great cities as they are to Liverpool. We cannot help feeling that Mr. Shallcross touches the keynote of what is one of the chief causes of the inefficiency shown by municipalities in their methods of dealing with health matters, when he attributes this to a large extent to the democratic form of municipal government. He says: "Whilst a democratic form of municipal government conducted upon party lines has the advantage of being submitted to keen and interested criticism, it may nevertheless have the disadvantage of depriving the community of the services of some of the most capable and suitable men of all parties, in the active control of the city, and it may have the further disadvantage that political leaders and workers are sometimes appointed to high positions as rewards for political services rather than by reason of their special fitness for such positions from a municipal government view-point." It stands to reason that a consistent and enlightened policy in regard to the health interests of a city cannot be pursued when the constitution of the Health Committee undergoes frequent changes, and more especially when councillors are chosen for political reasons rather than on account of any special knowledge and experience which they may be able to bring to bear upon the vital questions at issue. Much of what Mr. Shallcross has to say is founded upon the printed reports of the medical officer of health, and he very rightly demands that a more intelligent appreciation should be shown by the Corporation of these reports, and of the existing insanitary conditions to which attention is drawn, and which are accountable for much ill health and an excessive mortality. As is pointed out, town councillors are as a rule always ready to pose as sanitarians when the question under consideration is some large scheme of water supply, hospital accommodation, or abolition of an insanitary area involving a large expenditure, and is a subject, therefore, which attracts general attention; but very few really try to look beyond such matters and endeavour to make themselves acquainted with, or to pursue an intelligent action in regard to, the many less conspicuous health problems, the solution of which is of the greatest importance.

Amongst the subjects to which reference is made in this connection are: the prevention of the spread of consumption, by the adoption of more earnest and effective measures than a "request" attached to a lamp-post that the public should refrain from spitting on the pavement; stricter supervision of food supplies, more especially of milk; the energetic control of kitchens and all places where food is prepared for consumption; the education of the public in cooking; and many other matters which have a real and far-reaching influence upon the welfare and health of a community.

The Learned Horse of Berlin.

TIME was when we thought a great deal about the spelling pig,—the pig who could, at the word of his master, pick out, or rather nose out, A, B, and C from a number of letters of the alphabet, printed in large type upon cards. In later years we have had a number of musical prodigies, nearly all of whom have come from the Slav nations, principally from Hungary. It is no wonder, therefore, that we find that a Berlin learned horse, "der Kluge Hans," hails from Russia. Clever John, being the English translation of his German name, appears to possess the faculty of thought. A retired schoolmaster who possessed some horses remarked that Hans, who was in his possession, was most intelligent, devoted one hour a-day to his training on the ordinary lines of elementary schooling, *i.e.*, with blackboard and chalk, beads and objects for developing the sense of colour and smell, etc. In a short time Hans learned to reckon with precision, and now can add, subtract, multiply, and divide; he is now learning decimals and the rule of three. It is almost incredible what this horse can do. If one writes on a blackboard $2+2=5$, the horse at once stamps four times with his right hoof to show that a mistake has been made. Again, when a reading lesson is gone through on the blackboard, he can tell whether dog or cat, etc., is written, when he is requested by any one present to do so. When a hamper of different coloured rags was placed before him, he picked out any colour he was asked to. Still more extraordinary, and a fact which we would like to have corroborated, was that he gave on one occasion a correct answer to the number of men present who wore spectacles and those who wore eyeglasses, while he also indicated how many ladies in the audience were wearing green hats.

He appears to be able to tell the time on being shown a watch; he knows the value of money, bowing his head for "yes," shaking his head for "no," and is not, notwithstanding his accomplishments, above cleaning out his own manger, which he does with a cloth like any ordinary housemaid.

America has already offered 150,000 marks for "Clever John," but we hope that his owner will keep him on this side of the pond, and bring him over to this country some day soon to allow us to see the phenomenon.

ORIGINAL COMMUNICATIONS.

THE RELATION OF PHYSIOLOGY TO THE TEACHING PROFESSION.

By DAVID FRASER HARRIS, M.D., B.Sc. (Lond.), *Lecturer on Physiology and Normal Histology in the University of St. Andrews.*[1]

I CAN conceive of no calling the exercise of which involves greater responsibilities in matters of conduct—physical, intellectual, moral—than that of the Teacher. At the same time, I know of no one science the discoveries and truths of which relate more intimately to these same matters of conduct—physical, intellectual moral—than physiology, so that there seems to me a peculiar fitness in a physiologist being asked to address you. Though Professor Edgar[2] might have found one with a larger experience of the great problems awaiting consideration, I venture to say he could have found no one more fully alive than I am to the importance of those subjects common to the physiologist and to the educationist.

The profession which you intend to adopt, as noble as it is responsible, consists in the judicious directing of the human being through the most critical stages in his or her development; it is, or it ought to be, the scientific guidance of the growth of the physical, intellectual, and moral faculties of the human organism from a time not long after the dawn of intelligence to the time when the era of independent action has arrived. Not that every one of you will have to direct all those stages of growth, the early as well as the late; but whichever it be that falls to your lot, the responsibility is there, and perhaps the greater the earlier the growth-stage which you find yourself called upon to direct. Education is the *scientific guidance of growth*—guidance, because you cannot create, you can only work with the materials given you. Just as the physician can do no more than interpret and guide Nature (even though by aid of the Greek names so beloved by him he dignifies the processes into "diagnosis" and "prophylactic therapeutics"), so neither can you do more than guide Nature in the natures of the several organisms entrusted to your care. And yet you can indeed create, but it is the conditions or the environment only; *for* you, have been created dispositions, temperaments, tendencies, inherited and ineradicable. Ineradicable, because these co-called mental attributes depend absolutely upon what is for ever outside the realm of human, volitional, creative power, namely, protoplasm. You are directed to guide the growth of various immature organisms—more or less differentiated protoplasmic colonies, and that protoplasm is endowed with various attributes or faculties—tendencies and dispositions inherited and transmissible; but, for you, merely the material to work upon, things you can no more alter than you can the properties of the water, air, or earth. The sanguine disposition of one man depends as much on the particular character of the dispositions of the molecules of the protoplasm of his central nervous system, as does the sullen disposition of another man depend on his. The poet is born, not made; so is the wise man, so is the fool—"bray a fool in a mortar," and he is a fool still; he may be an educated fool, a refined fool, a civilised fool, but a fool still. And the wise man (with whom the classical philosophies are so laboriously concerned), he is born just as much as the poet or the fool; you may make him an educated wise man, a refined wise man, a civilised wise man—but you had a latent wise man to begin with, and you have made a better wise man than you started with, because you had a wise man to start with. The utmost you can do, then, is to guide youth; the responsibility is not to misuse the power, but to make the congenital fool a little less foolish, and the congenital wise man a wiser and a happier man. I am not mincing matters, for I believe that we do encounter fools, so let us be thankful when they are not knaves as well. We cannot too early in our careers as teachers get this into our heads—that we are what we are, and our pupils are what they are, by reason very largely of what we and they are hereditarily; that our and their dispositions, characters, likes and dislikes, are as much molecular properties of bioplasm, and especially of that of the central nervous system, as the perfume of roses is of the bioplasm of roses, or the stench of old fish is of the bioplasm of fish. The quick boy, the slow boy, the lazy boy, the energetic boy, are what they are because of the particular disposition of the molecules in their living stuff, especially that of their brains; and thus these qualities—quickness, slowness, energy of character—are as dependent on the *matter* of their bodies, on its invisible biochemical constitution, as the grain of granite is coarser or finer according to the size and grouping of the particles composing it. The quick boy will have a shorter reaction time, a stronger, fuller, faster pulse than the dull boy; *physical*, *physical*, *physical*—almost all is physical. I venture to say we have no idea how much one's whole character, intellectual and moral, depends on the vigour of one's cerebral circulation. All this is being abundantly recognised and acted on by those in charge of asylums, prisons, penitentiaries, etc. Character is daily coming to be regarded as fundamentally a matter of molecules and their inter-relations. Of course we have for long enough known that the hungry man was the angry man, that indigestion was one of the chief causes of irritability of temper, and that the question whether life was or was not worth living, depended on the liver; but the fact is, that not merely passing moods, but all that we mean by constitution and character, has its physical basis in the molecular organisation of the protoplasm of each one of us.

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[1] An Address delivered to the Education Society of the University, December 1903. This Society is mainly composed of students being trained as teachers.

[2] Professor Edgar, Professor of the Theory and Practice of Education, was chairman.

As a physiologist, I can come to no other conclusion, after not a little thinking over these problems; but if these things are so, their applicability to your profession and to mine is very clear, and it is briefly this,—if character, disposition, power of mind, mental faculties, are attributes of ultimate protoplasmic structure, *i.e.* phenomena depending directly on the physical constitution of the living matter, then the teacher who has to mould the character, weaken or strengthen the disposition, bring out the powers of the mind and direct the faculties, ought to know at least something of the details of the structure of the delicate and complex organism entrusted to his care. I have a right to expect that the watchmaker to whom I entrust my watch knows something about mainsprings and compensating mechanisms, and that the engine-driver to whom I entrust my bodily safety knows a very great deal about the construction of a locomotive, and everything about the signals.

Physiology is the science that tells me what I am, whence I am, and to a certain extent whither I am; it is therefore not only proper, but essential, that you who are to be the guides of the growing youth, and who will largely determine what he shall be, should know something of that science. To be perfectly plain, I hold that every teacher, *i.e.* every State-trained man or woman to whom is to be entrusted the care of the young, should be compelled by law to receive instruction in animal physiology; and in the event of his or her failing to reach a certain standard of excellence in the science, be prevented from proceeding to exercise the profession of a teacher. But you say, We are not going to be gymnastic masters, teachers of swimming, " professors " of dancing or fencing,—what is the meaning of all this talk about physiology, which is the science of *bodily* functions? I reply, Physiology is vastly more than the physiology of the muscular system; and do you suppose you can have thoughts or volitions, moral or immoral acts, apart from a central nervous system which is, after all, at least a part of the body. The less brain, the less thought; the more highly developed the cerebrum, the greater the chance of " high thinking "; do you want strong conceptions and pure thoughts? you must have a strong heart and pure blood. I do not say that thought is conditioned by nothing more than cerebral protoplasm, but cerebral protoplasm is very much more than half of the total conditions. Now, cerebral protoplasm may be in a good or in a bad state, its nutrition may be normal or abnormal, it may be clogged with waste products, it may have a full or a feeble blood supply, it may have been lately over-stimulated, or, what is more likely, not stimulated enough; and, in addition to all and probably above all, it may have, by inherited molecular disposition, certain obscure, but none the less definitely caused, tendencies, latent possibly, but soon to be patent—tendencies to actions of a certain sort and to thoughts of a certain kind, the totality of which dispositions we call "temperament." Now it is physiology that investigates the central nervous system in its healthy state, discovers the conditions of its healthy functioning, discusses the limits of its possible activity, and indicates certain rules to be followed in fostering its growth in bulk and in acquisitions. The fact that the formation of new cells in the central nervous system ceases before birth has an obvious applicability to educational problems. Of course I do not mean that *every* teacher is necessarily to teach physiology, far less become a physiologist; but he should know the structure of the delicate physical mechanism entrusted to him, or at least be familiar with the conditions of its most perfect and most vigorous action; and the knowing of this is the knowing of some of the physiology of the central nervous system, such as the signs of nerve-fatigue, heart-fatigue, sensory fatigue, etc. But no one could profitably begin his study of the human organism by taking the nervous system first of all, seeing that it is structurally the highest of all, and functionally, not only the most complicated, but is dependent on almost every other system. Before I understand nerve-impulses, I must know the facts of nutrition, general tissue change, circulation, respiration. In explaining the working of the army, I would not begin by describing the War Office, but rather the constitution of a company or a regiment and their officers. Similarly with the body: the central nervous system rules all other systems, so that we should know what these things are that are governed before we inquire as to what kind of things the governors may be. It is physiology, then, that teaches us what these things are and what these things do; of course, no teacher need be a neurologist, but every teacher should know the conditions of healthy activity of the central nervous system, and that these consist in such humbler things as digestion, absorption, circulation, respiration, and excretion. Humble things, I say, nor is it in any way derogatory to the dignity of the cerebrum to say it, or to know that the brightest and best thoughts are, in not a little measure, the brightest and best, because the stomach, liver, and bowels are working at their best. We are far too apt to forget the humble accessories. What avails a gorgeous banquet, if the potatoes are not boiled, and the salt has been forgotten! If physiology has taught me anything, it has taught me that there is nothing and no function in the whole physical organism which is, in its own place, "common or unclean"; every bodily act is the result of an exquisite co-ordination of otherwise more or less independent activities and neural mechanisms, none the less exquisite because "humble" and familiar. Familiarity in physiology never breeds contempt, but arouses wonder, admiration, reverence. That man or woman who can be irreverent during the exposition of the glorious adaptation of means to ends in the human eye or ear is lost for ever, dead in the most awful of scientific "trespasses and sins"—the lack of reverence and the incapacity to admire. But not only are these magnificent adaptations admirable; the drawing of a single breath, the throbbing of a single pulse—familiar and common things if you will—are, if properly understood, fraught with all the richest fruits of philosophy. You remember what Tennyson said was to be taught by the "flower in the crannied wall": the heart is of more value biologically than many flowers; then—

"Single throb of beating heart,
Man is not more than thou art:
Could I know you in your fullness,
Life had not one hour of dullness."

Physiology dignifies your profession, and physiology gives certain aspects of it their *raison d'être*.

But the teacher ought to know physiology for reasons other than those which are the underlying general principles of his profession, reasons of "common life," as it has been called. For instance, every teacher of a class and every head of a school must understand the physiology of respiration and ventilation; there must not be the mere opening and shutting of windows according to some one's passing fancy, but we must have it branded into our brains that no healthy life, even for a few moments, is possible without pure air, *i.e.* oxygen. This conclusion must be reached, not through hearsay on the authority of any man or book, but there must be an auto-branding; every man must be fully convinced in his own mind of the absolute and eternal truth of the statement that life without oxygen is an impossibility, and of course this oxygen is conveyed by the outer air. He must be prepared to go to the stake for this fact, and, having learned it, if necessary by experiment, he must see that he and those whom he teaches live in well-ventilated rooms. Well-ventilated rooms are much rarer than we imagine, and a well-ventilated public building is as rare as the dodo. Of course we have draughts, but a draught is ventilation out of place, and that is very dangerous to health. Why? I wonder how many people could tell me why the chill caused by a draught is so dangerous—for it is dangerous, and to be avoided like the plague. Living matter, in order to do work efficiently and to resist the invasion of the omnipresent micro-organisms, must possess a certain amount of heat—animal heat—*i.e.* must have a certain temperature, usually higher than that of the environment. Loss of this heat lowers the power of the body to resist micro-organic invasion; in fact, it diminishes all the expressions of vitality of the protoplasm. A draught is loss of heat to moving air—the sensation of this is a "chill"; as we lose heat, the powers of resisting the micro-organic invasion are lowered. Now, in all public assemblies there are present many of the disease-producing "germs," so that we are invaded at the moment when least able to resist. We "catch" a common cold or a more definitely nameable disease (*e.g.* pneumonia), through our loss of heat having caused lowering of the natural bactericidal power of our blood-cells. To understand all this, you must have had some training in physiology, and have seen blood and bacteria, too, under the microscope, else you may late in life exclaim, as did an elderly clergyman on seeing a drop of human blood under the microscope, "Oh, it's exactly like the diagram in Huxley's 'Physiology'!"

Now the mention of bacteria or "germs" leads one to speak of the need of *instruction* in that great modern generalisation, the germ theory of disease, a subject only to be properly apprehended *after* some study of physiology. The time is surely come when instruction should be early given in the principles underlying vaccination, zymotic infection, prophylactic inoculation, antitoxic injection, and serum therapeutics in general. "Oh, but," you say, "the young people's parents are the proper persons to so instruct them!" Perhaps in an ideal world, but at the present time parents don't know very much about it; the children of to-day are the parents of the future, and you are their teachers; you therefore must be first taught these things. Far more important, these solid facts of biology and micro-biology, than classical mythology and the lists of mediæval murders and murderers with their "dates." The teachers must be got to see that, as following upon the knowledge of pathogenic germs and their products which we possess, the legislative enactments relating to such matters as small-pox and vaccination (only to take one specific case) are not otherwise than imperatively called for. They will, of course, be taught to disentangle the hygienic value of such enactments from any political associations they may have, and to regard it as demographically a matter of moonshine which "party" brought one of them in, so long as it *was* brought in, and thereafter carried out. Having been previously instructed in physiology, the teacher of the future will understand the etiology of smallpox and the meaning of "immunity conferred by the inoculation of a weakened virus," so that, though he can speak hardly as an expert, still his statements can be made with sufficient authority, as coming from a person not totally ignorant of biology and the practical application of its truths. I hope the time is not far distant when every educated person will be compelled to give assent to, *e.g.*, the four or five following statements:—

1. That unvaccinated communities are to-day as liable to the scourge of smallpox as any community in pre-Jennerian times.

2. That vaccination, as practised by Jenner, prevents smallpox becoming epidemic where it occurs sporadically; and, as a matter of incontrovertible historical fact, vaccination has prevented anything like frequent epidemics of smallpox in certain countries.

3. That to refuse to be vaccinated, and go about unvaccinated, or to refuse to allow one's child to be vaccinated, is as culpable a piece of negligence, and is, from a social point of view, as immoral as it would be to walk about with a pound of dynamite in one's pocket.

4. That the present laws on the subject of vaccination are on right lines; and

5. That the man who will not obey them must be forced to leave the country; he ought not to be allowed to reap the benefits accorded to the intelligent citizen while he is a constant and wilful menace to the health of the community.

Persons with the requisite biological instruction will give assent to these propositions, even if they are not in the habit of drawing conclusions from facts, while those who have not the requisite biological instruction cannot be admitted to be competent to pass any opinion at all. These considerations are not of merely academic interest, but of vast, vital, personal importance; far more important to the community than discussing the wars of the Greeks or the Persians, or even the Wars of the Roses. I cannot admit that the scientific laity as such, previously uninstructed in these matters of micro-biology, the underlying principles of which are physiological, can be in any sense authorities on subjects involving this special knowledge. But it is just this ignorant, gratuitous criticism that we have so much of to-day, with its outcome of "conscience clauses" and consequent epidemics. Of course I don't want everybody to be a bacteriologist, and I know that we cannot expect every one to be logical; but we can ensure that the person who is not in a position to profit by the work of the specialist, and cannot draw obvious deductions from facts, shall not become a source of social danger either by his opinions or his person. I am afraid that this irresponsible criticism of the laborious results arrived at by men who have spent many years in the pursuit of truth, is greatly on the increase. Of course, the superabundant journalism of the day greatly fosters it. We have far too many people talking and writing, instead of thinking and working; something new and if possible startling must be written by to-morrow morning, and in the midst of superfluous "articles," all sorts of things are discussed without adequate knowledge, space, or patience. Things and people are attacked with a virulence and apparent omniscience that is truly monstrous. In illustration of this, take the case of the criticisms poured out on every one concerned in the late Boer War.

What we want to-day as much as anything is reverence, and the young especially need it—reverence for science and the teachings of scientific men. Not, of course, superstition and awe bred of ignorance, but that sympathetic reverence for natural knowledge which a careful study of science alone can give us, which at any rate a whole library of the lives of immoral kings, queens, popes, and politicians never can. Along with this irreverence goes cruelty. The boy before he has learnt anything, and the man who knows very little, is usually very cruel; the former pulls the wings off flies and hangs cats up by the tail; the latter promotes cock-fighting and prize-fighting, until he gains some knowledge, and then to his knowledge he adds sympathy, and to his sympathy, reverence. Now it is physiology that teaches me reverence—reverence for that magnificent mechanism, the protoplasmic organism, be it jelly-fish or diplomatist; reverence for the living body, and admiration for it—for every living body, from amœba to man. There cannot be any "Nil admirari" in science, any approach to it should be shunned as an accursed thing. But in studying physiology we are taught not only scientific reverence, but much of the essence of public and private morality. Is not a very great deal of immorality a want of reverence for the body, or, as some would say, the soul? But while we are waiting for the metaphysicians, theologians, and others to tell us what and where the soul is, we can be very profitably employed in getting to understand something about what people believe to be its beautiful tabernacle. In lieu of more definite information on the subject of the soul, let us get to know what physiology—the science of the shrine—has in store for us. Studies of souls without previous knowledge of bodies, lead not to reverence or even common sense, but to "conscience clauses" and epidemics.

Much of what I have been saying has arisen from our speaking of the necessity of a knowledge of the great germ theory, a scientific generalisation that can rank, in the width of its application to natural phenomena, with the great generalisations associated with the names of Newton, Harvey, Helmholtz, and Darwin; but, obviously, to understand "about germs," a previous knowledge of physiology is needed. Just for a moment consider the different subjects upon which it has shed valuable light—the healing of wounds, *modern* surgery practically dating from its promulgation; the vast subjects of etiology, pathology, and therapeutics of zymotic diseases; the whole chemistry of dairy farming and the artificial preservation of food stuffs; the chemistry of putrefaction, of the disposal of sewage, of the nitrification of soils and of manures; and the chemistry of brewing—in fact, the whole of the understanding of fermentation, not to speak of certain subjects in pure science, such as the chromogenic powers of bacteria, their polymorphism, the bactericidal powers of light, and certain purely theoretical considerations, such as the size of the molecules of protoplasm and of albumin. To know nothing of these things is to be dead to the modern half of the science of the living, and is in science comparable to the state of the man who knows no dramas since Shakespeare's, no music since Handel's, no painting since Raphael's. The understanding at the present day of the chemistry of fermentation is just as important in after-life, and is related to as many vital questions of huge import, as understanding the subtleties underlying the ground for the divorce of Catherine of Aragon. It would almost seem as if we were afraid of keeping abreast of the times, afraid of realising the extent to which we are surrounded by impalpable but none the less implacable foes—some of "the powers of the air" made manifest by science. But a knowledge of physiology must come first, and I do not see that it is coming even to those who shall be teachers to-morrow. The late Professor Huxley declared that he had been "a bore" on the subject of the importance of a general knowledge of physiology; but I cannot see that we are to-day one whit better in this respect than thirty years ago when he spoke. Physiology actually does not form one of the very many subjects which make up the group for the degree of M.A.—and that after the deliberations of the men of "light and leading" who composed the Scottish Universities Commission. Thus far we have said hardly anything about what is supposed to be the main duty of a teacher—the training of the mind, because I at any rate hold, paradoxical as it may seem, that the needs of the body must be well looked after before those of the mind be in any way specifically catered for. You cannot expect to get delicate results from a coarsely made machine, fine reliable results from a thing put together haphazard.

One of the most important body considerations is athletic exercises, and many men certainly imagine that taking exercise is *the* one thing in life. In this matter of school athletics, if anywhere, physiology must be heard. The gist of the subject, from the physiological side, is, that of course a certain amount of muscular activity taken in the open air, and if possible in the sunshine, is absolutely necessary for the maintenance of the highest health. But here, if anywhere, must there be no hard-and-fast rules, *e.g.*, as to the number of hours to be given to athletics, for what may be an excessive amount for one boy or girl may not be nearly enough for another. The amount of muscular exertion which the youth possessed of well-developed muscles and a strong heart can put forth is too much for the youth with poorly developed muscles and a weak heart. A knowledge of physiology is required here to guide the teacher in deciding each case on its own merits. It does not follow that all boys of the same age should take the same amount of exercise, or that the same form of athletics is suitable for all alike; it is manifestly not so. We must have no cast-iron rules about running so many times round the house. A can run thirty times round the house, B cannot do so three times with impunity. For the last fifteen years we have heard a great deal about athletics and gymnastics for girls, and their introduction into the ordinary school life of the girl is a most enlightened innovation; but I am quite sure that in their violent out-of-door games, girls require close supervision. Most of them, those of high spirits, have a natural tendency to overdo their games, and for some of them, in the actively growing period, I consider hockey a dangerous game. To judge of these things, not of course as an expert, but as one who knows when to call in the doctor and when not, the teacher must have an understanding of the main facts of the circulation of the blood. He should know that muscular contraction, by pressure on veins, is one of the most important factors in determining the return of blood—impure blood—to the heart, so that it is perfectly easy to overload the heart through muscular activity alone. I am not speaking about the onset of fatigue at all, important as muscular and neural fatigue are, but about a condition, overloaded heart, which, as most people know, can be brought on in a very short time after the commencement of the exercise. Now it not infrequently happens in young people of both sexes, that we have a condition of powerful muscles and a weak heart, precisely the kind of case requiring close supervision in the matter of bodily exertion, for it is clear that in proportion as the muscles are powerful, the heart can be the more quickly and effectually overloaded. To the eye of the layman, however, this class of youth would be deemed quite fitted for "any amount" of running, jumping, swimming, and gymnastics, whereas to the educated eye the conditions here that might lead to permanently dilated heart are all present. I am certain that many young people of both sexes have in this way gravely damaged their hearts. There must then be no rules as of the Medes and Persians about exercise for the young, growing, and therefore easily injured frame; both the quantity and the kind should be left an open question for each case in turn. If it is objected that the giving full weight to these considerations would seriously interfere with the time-table of the classes, I reply—so much the worse for the time-table; are ye not of more value than many time-tables? For, after all, what do we want? Not a few geniuses, or many fact-crammed intelligences, but bodies and minds of a so-called "all-round" order, thoroughly furnished for the coming struggle for existence. For I suppose that, after all, the "whole duty" of the teacher is to impart the principles that make for success in the lives of his pupils; and I suppose we all believe that success by no means always comes to the most brilliant, but rather to the man of average ability with infinite powers of taking trouble and a good digestion. I am not joking: the condition of the circulation and the condition of the digestion together make up about nine-tenths of temper and disposition—important factors in success.

Must we always be taking exercise when we are not doing brain work? By no means. There are some educationalists who seem to believe that outdoor exercise is the cure for every ill that youthful flesh is heir to, and they seem to assume that recreation is synonymous with exercise. I would like to explain to these persons what the physiology of rest means. There are times and circumstances when it is not only no recreation to take exercise, but positively harmful to do so. We are apt to forget that mental effort involves fatigue; it is not always wise to add to it muscular fatigue. Nature's indications may here be followed. After that prolonged fixity of the attention, which is, or should be, the condition of the mind in "learning lessons" at school,—for, of course, when mental work is to be done, it should be done with the highest degree of concentration of the attention,—there is produced a distinct fatigue of the central nervous system. Nature would now indicate a period of repose, preferably in the open air,—if not of complete rest, then of such muscular exercise as cannot possibly involve fatigue. Those who feel fit for exercise after mental work may take it; but anyone who feels disinclined for it should not only not be forced to take it, but should be examined for possible defects of constitution. Young people vary enormously in their capacities for sustained effort and in their susceptibilities to fatigue. Those who seem to be very easily tired, or whose attention it is very difficult to fix, for even a short time, will be found on careful examination to be suffering from some disability of circulation, *e.g.* anæmia, or from an incapacity of nerves, neurasthenia. I tremble when I hear the relatives of an anæmic or neurasthenic young person tell him or her to "go for a smart walk in the wind"; what that person wants, young though he or she be, is rest, quiet, and good feeding; but, above all, rest. No one can work till he has a store of oxygen already accumulated. It is most fatal to go upon the assumption that because all those at school are young, they are also robust. It is no doubt sad that some young people are anything but strong—but many things that are facts are also sad. The not perceiving of this fact has made of some school-boys, and more school-girls, life-long invalids. I want to emphasize the *physical* responsibility of the schoolmaster, mistress, or tutor. (The very sad case of Prince Rudolph of Austria is an illustration of what I mean. A cast-iron *régime*, involving getting up too early, and working too late and too hard, created a condition of permanent nervous irritability.) Now, it would be well to know the physiology of fatigue, its signs and physical concomitants; and also to know that protoplasm never works continuously. We speak of the constantly beating heart; but it may interest some of you to know that, in the course of the twenty-four hours, the heart actually rests no less than nine hours. So it is with all the more active tissues; their times of activity alternate with periods of repose; and the law of the tissues should be the law of the organism which they constitute. The physiology of rest is not sufficiently known—the value of resting not sufficiently appreciated. Work as hard as you can while you have to work, and rest as often as you possibly can in the intervals. Do you know the value of lying down to rest, for the heart has far less to do in the recumbent than in the upright posture?

This and much more we learn from a study of the circulation —upon which, you see, we are constantly thrown back. Now let us come to the class itself, and to the intensely practical question, Shall it sit or stand to "learn its lessons"?—the answer is most emphatically, *Sit.* The physiologist knows how the upright posture involves fatigue, and that this fatigue is not merely muscular but neural as well, for the maintenance of the erect posture is a neuro-muscular act. It involves a whole series of muscular adjustments directed to the continuous task of preventing the various segments of the body from falling backward or forward of the transverse vertical plane—a series of adjustments that finds expression in a series of to-and-fro and side-to-side oscillations which can, by appropriate device, be graphically recorded. In plain language, we cannot stand still; the most obedient child, the most conscientious sentry at "Attention," the most deferential stranger commanded to "Halt," never yet did stand still. These muscular adjustments in the earlier stages, before the posture becomes monotonous or painful, are carried out sub-consciously; they nevertheless involve fatigue, apparent in time. The physiology of fatigue has not yet by any means been sufficiently attended to. I venture to say that after a class has been standing up for some little time, you will find the *vivâ voce* replies more inaccurate and more slowly given than after the same class has been seated for an equal length of time. Although we have much to learn, our study of fatigue teaches us that the physical part of fatigue is the discharge of effete material which clogs up, as it were, the molecular wheels of the living machine. Fatigue is the temporary functional incapacity due to the accumulation of katabolites, whereas exhaustion is the actual using up of the living material beyond the limits of repair or reconstruction. This is the technical import of the terms; exhaustion means irreparable structural damage through excessive activity. Now, surely all teachers should have *some* knowledge of what neural fatigue means, of what are the signs of fatigue of the sensory, nervous, and locomotor systems. This is surely necessary, in order that we may direct aright the quality and quantity of the output of energy in their relations to age. Teachers are in the main concerned with immature, developing organisms, and it is precisely these in which the activity limits should be carefully looked to. I am rather inclined to think that we begin to "educate" the young brain too soon and leave off too soon.

We have too many cases of very bright young children who in a year or two do not fulfil the very good promise that they have given. The reason for this is, that we gave the developing brain far too much to do while it was still structurally imperfect, overloaded it with impulses from without, and, as a consequence, with an amount of fatigue products much too great for its delicate, partly formed, unfolding substance. In other words, its retaining power was not equal to its affectability; affectability first appears —the power of receiving impressions—and then later, and, as a result of previous judicious activity, appears receptivity, or the power of retaining impressions, of using them, of synthetising them. A high degree of affectability is often mistaken for cleverness—and such, if you wish, you may call it; but something more is needed in the central nervous system as the underlying principle for ability. The country can do with a *few* geniuses as its ornaments, but its power resides in its fully-developed but not over-stimulated brains. If you could only realise that you are dealing with as real an *organ* as is the surgeon when he incises the liver or cuts through a muscle. The eye of the physiologically trained teacher must know the limits of the safe exercise of functions the most various—the activity of eye and ear, and of attention generally, of the heart, and of the other muscles. This must follow, if we believe that education is what Professor Edgar so well calls it—the scientific directing of growth. But how can you direct what you do not understand? You say, "Our business is to communicate ideas." Good and well, if the soil is all right; but you must see to it that it is at least productive. There is little use in sowing good seed in anæmic, depressed, over-stimulated, or fatigued brains. It is a throwing of intellectual pearls before protoplasmic swine. "But," you may say, "all this physical preparation should be done by the parents." Let that be granted; at present the parents do not know how to do it. I speak for the future; it is you who are to train the parents of the future in their duty.

That I am not laying too much stress on the physical aspect, is evident from the revelations of the late Commission on Physical Education in Schools and as to the State of Recruits for the Army. Sir Norman Lockyer, in his presidential address to the British Association this year, cried aloud for more "brain power." All the universities in the world cannot confer brain power upon brains physically unfit to be exercised. So-called "brain power" is a function of brain tissue; and the constitution of brain tissue is a question of nourishment and of the endowment of brain tissue, *i.e.* of inheritance, and of action of environment, which latter includes education.

The teacher is then, in the first place, to be the director of physical exercise, and may safely begin by prescribing, for every one, simple breathing exercises—the full inspiratory expansion of the chest. Imperfect pulmonary ventilation is the cause of much lung disease. I know of at least one school where breathing exercises are regularly carried out. The teacher would have to settle a question which arises at the very beginning of the day, namely, Shall classes be held before breakfast? The answer of the physiologist is emphatically "No." In a school there ought to be quite enough to be done in the way of bath-taking and dressing to occupy the time before breakfast without entering upon studies. Work done at this time is done in a state of hunger, and often before the rooms, in winter, can be heated, and is certain to be regarded by the pupil as decidedly unpleasant. This is a most unfortunate concomitant of any kind of mental work, and certainly tends to make it of poor quality. We all know about Sir Walter Scott, Trollope, and others, who did good mental work before breakfast, and about Sir Isaac Newton and Edison working all night at a problem; but the cases of a few great men cannot be the guiding rules for school children. What a full-grown man, who is intensely interested in the work in hand, may do, is no example for "lesser lights." But thus it is that some school-hours are made positively purgatorial, when, *e.g.*, young girls are knocked up in winter, and, without food, made to play on the piano before breakfast. This, and this sort of thing, is far from right. Teach your classes, especially of young people, in bright, warm, sunny rooms; make lesson-time as physically pleasant as possible, and even the quality of the work will improve. Unquestionably the supreme concern of the teacher is the superintending of the functional acquirements of the brain, and this is attained by the opening up of as many new paths as possible into and within the various sensory centres in the cerebrum. But this inevitably means the opening up of the lines of communication (by the multitudinous commissural fibres) between the sensory and the motor centres. This is what education means—inter-cerebral co-ordinations and the establishment of sensori-motor paths.

The first process in all this is the training of the sense-organs, the sending in of impulses through these great avenues between the outer world and the inner man: pour in impulses, judiciously of course, but pour them in through *all* the sense-organs. Give eyes, ears, taste, smell, and touch all something to receive; let hands be trained along with eyes and the important muscular sense trained with the rest. Education is, first, sensorial reception; then cerebral perception; lastly, motorial execution; and the corresponding functional endowment of the centres involves and causes the actual histological differentiation of the cells of these centres. This training of sense-organs is practised in the earlier years in the Kindergarten system; but this gives way too soon, and just when the intelligence is expanding, to a system of a totally different order—book-learning. What is wanted is a still wider acquaintance with nature—with matter and energy as well as with all accessible forms of life—everything available for sensory knowledge at first-hand. No doubt much has been done in the way of teaching zoology and botany as well as chemistry and physics, and a little, a very little, physiology, in many schools; it is all on right lines, and needs encouragement and extension. Even the small amount of real knowledge of this kind derived directly from nature—giving an insight into the properties of matter, the correlations of energy, the structure of the flowers and trees, the habits of insects, birds, and beasts, the meaning of sunset colours, of the rainbow, of the tides, winds, meteors, and eclipses, is more enduring and more valuable for the business of life than very much philological and purely antiquarian lore about dead languages and dead nations—intellectual luxuries rather than necessities.

Of course this knowledge-by-reception should be acquired *pari passu* with the knowledge-by-execution; the training of hand, *i.e.* of muscular sense, cannot be commenced too early. Now I know of no hand-training equal to that afforded by the manipulations of practical physiology. Show me a person who considers himself neat-handed, and I will disillusionise him in half an hour. This is *the* training for the teachers themselves, for they acquire thereby not only knowledge of the living matter at first hand, but they are taught steadiness in muscular adjustments, delicacy of perception of the muscular sense, and the necessity for promptitude in action. There is almost no other science which trains so many faculties at once—power of observation, the drawing of inferences, criticism of results in light of theoretical considerations, the avoiding of numberless experimental pitfalls, creative power and resource in emergency, not to speak of trials of physical endurance, of patience and of temper. I frequently point out to my students that physiology trains far more than one's intellect. But all this means training of the nervous system, because it means sensory knowledge correlated to subsequent muscular adjustments. Knowledge of the physiology of the central nervous system would never allow a man, for instance, to read too much before going in for an examination. He would know that the facts poured in—fact-bearing impulses poured into his central nervous system until neural fatigue sets in—can never be properly assimilated or reproduced, *i.e.* are of very little value. A fatigued brain is a non-receptive brain, and if a brain is non-receptive, while you are instructing it, it cannot reproduce what it has not in reality received. It is, after all, very largely a question of physical factors. The brain-substance must have plenty oxygen, which it can only get through much pure blood. It may be humiliating to the great philosopher to be told that his finest thoughts are largely conditioned by the purity of his blood, and *that* by the state of his intestines and kidneys; but it is true for all that. Some students know that the brain works best just after moderate exercise, which means that its circulation is then more than usually vigorous—and so we are thrown back once more on the circulation. But another consideration would not let a person overwork himself or herself before an ordeal of any kind, namely, the fact that the more protoplasm has done for a certain time in the immediate past, the less it can do for a time in the future. Work previously done means the diminished capacity for work in the immediate future. This is nothing new—the tired man cannot do very much. Protoplasm that has rested and is fed is in a state called by the Germans "Leistungs fähigkeit," or capacity for (future) activity, as we would say. The principle is nothing new —Rest well to work well.

A study of physiology is of value in sweeping away superstition, first from the mind of the teacher and then from the taught. While I suppose no one now believes that the female skeleton at the present time suffers from a deficiency of a rib on one side, as an hereditary modification in consequence of the formation of Eve out of Adam (as I was taught), yet a very large number of people, it would appear, believe in what they call "faith-healing." Now, no one believes as firmly as I do in the power of mental states over bodily, but to admit the contentions and even so-called "facts" of the "faith-healers," is to place one's self intellectually on an equality with the most superstitious of believers in the miraculous in the darkest ages of the Church of Rome.

There is still much superstition as to certain questions of heredity, descent, and allied subjects. Some people believe that Mr. Gladstone lived to be over eighty, because he chewed each mouthful twenty-two times. Physiology teaches us that the greatest possible caution is necessary in drawing inferences from even the best authenticated facts; it introduces us to so many factors and modifying conditions entering into even the simplest functional problem, that it constitutes an intellectual training of unparalleled value. I could name several problems in physiology fitted to tax all the critical acumen that can be brought to bear upon them by highly trained biologists. A knowledge of physiology would quite dispel the idea that the physical organism of man is perfect, in the sense that his mental powers may be considered perfect, as expressed in Shakespeare's famous lines in Hamlet, beginning, "What a piece of work is man, how noble in reason, how infinite in faculty . . . in apprehension how like a god, the beauty of the world, the paragon of animals." While most reverently admiring the exquisite correlation of functions and means to ends in the animal organism, we can easily point out a large number of "defects." Beginning with the obvious facts of facial asymmetry (said to be very marked in criminals), we can pass on to organs, and catalogue a number of so-called defects, even in such an exquisite mechanism as the eye—opacities in lens and vitreous, fluorescence of media, peripheral colour blindness, and so on—and could conclude by remarking that even our general metabolism is often greatly at fault. A large number of people are kept all their days on the verge of attacks of acute gout, by a perverted nitrogenous metabolism giving rise to uric acid and allied substances, either too copiously for elimination, or in a form not amenable to excretion. It is not generally known that, even in normal digestion, compounds actively poisonous, were they to get into the blood, are formed. Normally they are rendered non-toxic in absorption, but when "something goes wrong" with absorption they soon make themselves unpleasantly felt in the familiar sick-headache, etc., for auto-intoxication is not by any means so remote a contingency as you may think.

The fully equipped teacher of the future will know something of the composition of foods, their nourishing values, the principles of cooking and their application to digestion, and the relative cost of food-stuffs. It has been well said, there is probably no nation so fond of good cooking as the English, and none with fewer good cooks. It is notorious what bad caterers the most of the poorer classes are, how vast is the kitchen waste through bad buying and bad preparation of food. Dietetics and dietetic statistics should form part of the instruction for all teachers. It is just as important to be able to prepare porridge or coffee as it is to play the piano, and it is oftener asked for. Is there any nation that drinks worse coffee than we do? *Punch's* picture was founded on fact—"If this is tea, I wish coffee; if this is coffee, I wish tea."

We lastly come to what may be regarded from a certain point of view as, after all, the most important of the teacher's responsibilities, I mean the teaching of the young to practise *inhibition.* As consciously exerted, this is a purely cerebral function, and one of the highest, if lateness of appearance in cerebral functions be a measure of functional eminence. Inhibition is a technical term for restraint, and I fancy that we would all admit that restraints do not come naturally, but are rather late and laboriously evolved productions. The young child, like the young animal, is a bundle of reflexes, and the early training of each of them is a training in restraining—in practising restraint. The spinal cord is a great linear series of reflex centres, of which the actually lowest in space is also the lowest psychologically. Even these reflex centres of the more lowly animal functions are not mutually independent, but any one of the series inhibits the activity of the one below and is in turn itself inhibited by the one above it. As the child and the animal grow up, they learn to voluntarily inhibit these lower reflexes (concerned with abdominal and pelvic viscera). That this is carried out exclusively by the brain, is proved experimentally in "the spinal animal," and in man in cases of spinal disease, in which cases volitional restraints are impossible: in the former case the seat of the inhibitions has been destroyed, in the latter the paths of conduction of them to lower spinal centres have been cut through. This mutual-restraining action between various levels of the central nervous system is, then, the physiological basis of inhibition. The lessons of inhibition are sometimes learned through painful sensory experiences. The sight of the fire is sufficient, a second time, to arouse in the burnt child an inhibition of the movements caused by the desire to touch the glowing coals, and the stinging nettle may for a time be the source of many inhibitions of desires to pluck harmless as well as harmful plants. A child may have cried so long for the moon that it received a whipping, the recollection of which is sufficient to inhibit its desire next evening for all bright objects.

There may, then, be said to exist an acquired antagonism in the nervous system between its higher and its lower regions—no doubt the physical basis of what is called in religious language, "the conflict of the higher and lower natures." As the individual is the more trained, restrained, educated, cultured, these inhibitions are more numerous, better developed, and more easily called forth; and that social state is the highest, or at least the most complicated, in which the greatest number of restraints to individual freedom of action exist—restraints, of course, in the interest of the common good. In the simple village you may keep poultry and other animals, have a dunghill close to your neighbour's door, practise on a musical instrument till two in the morning, and so on; but in the more complicated urban community, poultry and dunghills are nuisances under the Public Health Acts, and musical instruments equally so by common consent, not to speak of police bye-laws.

This restraining, then, of the freedom of the individual in the interest of the many, is brought about through his being constrained to practise inhibition; and all individuals do not learn it equally quickly. I want my way, you yours; but we soon find that we can neither of us have it wholly, and so we inhibit much that we desire; we mutually adjust ourselves, within limits, to conform to the prevailing "tone," and to that extent are good citizens. But the man who will inhibit almost nothing, who will have all he wishes, without regard to you or me or his neighbour, is to this extent anti-social. He has not learnt inhibition; he may be a mere harmless "crank" or faddist; he may be a most dangerous criminal. Lack of inhibition is the physiological basis of a very great deal of crime: the so-called "Hooliganism" of large cities is a case in point—bands of young men wandering about at large unrestrainedly, smashing everything, including heads, that they encounter: they have not learned inhibition. No matter how much a man learns, if he has not learned inhibition, his education is woefully incomplete. The applicability of this physiological function of the cerebrum, namely, inhibition, to the upbuilding of character is obvious. "The habit of doing that which you do not care about, when you would much rather be doing something else, is invaluable," wrote Professor Huxley. Inhibition is the alpha and omega of education: it is the alpha, for it is the very essence of morals, private and public. Just as love is the fulfilling of the law, so is inhibition the fulfilling of the condition which makes harmony and a co-ordinated whole out of the otherwise anarchic activities of the nervous system. "Even if I give my body to be burned, and have not" inhibition, "it profiteth me," physiologically speaking, "nothing." An educational training that does not develop inhibitory powers is worse than no training; then, indeed, would we have "a nation of educated devils." He would be a bold man who would deny that modern life does not afford plenty opportunities for the exercising of this power. Inhibition is as much of the very web and woof of physiological psychology as is volition; in fact, they are not only *not* different processes, but in many instances identical, *i.e.*, there is volition or will to act, and there is the will *not to act*, which *is* inhibition. There is, then, volitional inhibition—the active will to restrain action begun or to prevent incipient action from becoming actual. The physiology of this is, that the spinal centres for muscles must receive from the cerebrum, through special paths, impulses of a specific order, namely, those tending to diminish the excitability of the lower centres. The precise mechanism of this restraint is still not wholly known, it may be an interference phenomenon.

We cannot, I need not say, inhibit emotion. We can no more inhibit the uprising of an emotion, a desire, than we can inhibit the rising of the sun. We can keep out of his rays, and we can similarly walk off from the emotion-producing scene; but there is no mechanism in the central nervous system for preventing the development of pleasure on viewing a fine landscape, or of pain on touching a red-hot coal. All that we can inhibit are the incipient motorial impulses to action; but it is a very great deal, and life teems with opportunities for the restraint of incipient action and tendencies to action. This is the physiology of the withstanding of temptation. The physiological statement of the neural processes may be new, but the necessity for inhibition is as old as the dawning of religion, and of the first strivings towards higher and better things than those of unrestrained animal nature. Our manifold temptations are just so many occasions of restraint; and it is as true to-night as it was all those centuries ago when it was written, that "he that ruleth his spirit is better than he that taketh a city."

ON THE METHODS OF PERCUSSION EMPLOYED IN EDINBURGH AND GLASGOW; WITH SPECIAL REFERENCE TO THE IMPORTANCE OF MINIMISING THE STROKE IN MOST CASES IN THE DELIMITATION OF AREAS.

By W. T. GAIRDNER, K.C.B., M.D., LL.D., F.R.S., *formerly Professor of Medicine, University of Glasgow.*

IN the course of having to superintend the studies in the medical art of two sons in succession over a considerable term of years in Glasgow, I have had my attention directed to certain differences in the methods of Edinburgh and Glasgow tuition, of which one, at least, has seemed to be of so much importance, that I have now determined to devote this article to it, in the hope that both in Edinburgh and elsewhere matters involving fundamental principles may be more fully considered, and if possible acted on more in conformity with these physical principles, and therefore with more general uniformity and consent than hitherto.

The matter alluded to is the method to be employed in percussion, with special reference to the force of the stroke, and the conclusions to be drawn from the differentiation of results in various areas in which delimitation is of great consequence. It is no longer doubtful to me, judging from what has been told me, in particular by the younger of my medical sons, that in this respect the manner of delivering the stroke in Edinburgh and Glasgow differs to an appreciable degree, and the difference is probably, if not certainly, due to the general instructions which, in thirty-eight years of a professorship in Glasgow, I have had occasion to impress upon a corresponding number of classes of students, both in systematic and ward teaching. But as it has only occurred to me recently to attach this kind of importance to my own instruction, and as I should be very unwilling to overestimate the difference in question, I am glad to be able to avail myself of words committed to the press so early as 1885, and primarily intended, not for any controversial purpose, but simply for the full clinical exposition of what seemed to emerge from the consideration of a particular case; and I am far from asserting or claiming that the views expressed are in any respects absolutely novel or peculiar to my own teaching. It will remain for each reader of the following remarks to arrive at conclusions for himself; but it is not too much to suppose that matters which have occupied my own attention during a long career as a teacher, and have been deliberately formulated in the oral teaching of a considerable school during so many years, may have been so dealt with under the influence of personal suggestion as to demand either some definite criticism or some rectification of the methods referred to on the part of others; and as my own influence is now permanently withdrawn from direct teaching, it is only through an article like this that an erroneous bias existing, if any, can be further controlled.

In the *Medical Times and Gazette* of 19th December 1885, very closely corresponding with the decease of that once eminent and excellent journal, I find that I made the following remarks in commenting upon a case in which the percussion of the abdomen had to be regulated so as to discover a certain amount of thickening of the great omentum. The condition in question was demonstrated on many occasions in this case, and was partially illustrated by a diagram, which, however, it is not considered necessary to reproduce here. The conclusion reached was (omitting details for the present), that "there was thickening of peritoneum generally, and especially of the great omentum, by fibrinous deposits, including perhaps some fluid, but not such an amount as to give rise to physical signs as such."

On this occasion I so far diverged into discussion of the general subject as to furnish forth a report which will serve me well in reference to the present article, and from which, therefore, I take the following somewhat extended extract:—

"Upon this subject of the *minimised percussion-stroke*, I should like to take this opportunity of making a few remarks incidentally, because it is one, in my opinion, erroneously, or at least ambiguously, stated in some of your text-books; and practical errors and confusions arising from this source are not uncommon in my experience.

"Most persons, and almost all beginners, in employing percussion for the delimitation of organs, *err by percussing too hard.* The desire is, naturally enough, to get a definite and recognisable *quantity* of sound; and, by percussing hard, more sound is got, of course, than when, as in the observations just referred to (case of Mary Jane S.), a carefully minimised stroke is employed. But in increasing the quantity of sound so as to make it apparently or really more easily audible, you are, in most cases, *exactly in a corresponding degree reducing the value of your results.* In other words, the carefully minimised stroke gives you approximately exact definitions: while the stronger stroke necessarily gives you less exact, or wholly inexact, limits of dull and clear areas under like circumstances; the degree of inexactness or vagueness of the results increasing immensely with every degree of added force employed, so that, according to the quite ordinary mode of percussion used by many persons, and by almost all young or inexperienced persons, nothing like exact results can ever be obtained at all. Both in the case of Mary Jane S., for example, and in that of Jane M., all the best results of our percussion would have wholly escaped us had we employed such a force of percussion-stroke as I observe many of you employ through an instinct and habit that it seems to take much teaching to get over.

"Piorry, the great master of *mediate* percussion (as he first called it), and unquestionably a very great man in this art, appears in his numerous writings to proceed throughout on the assumption that percussion operates directly downwards, or in the direction only of the impact, in the way of educing the characteristic sound; and accordingly he speaks always of *superficial* and of *deep* percussion (*percussion profonde*) as if they were facts of the same order and of equal exactness in the delimitation of organs. No doubt Piorry had ways of his own of attaining valuable results, both from superficial and from deep percussion, and of thus obviating practically some of the faults of his method, or, at all events, of his doctrine. But he left a legacy of fatal confusion to his successors, by teaching that for every organ or structure in the body there was a process of delimitation of its deeper relations, which he implicitly regarded as equally available for exact definition with the superficial; the means for deep percussion being simply a stronger percussion-stroke, which, as I have already said, can never under any circumstances give an exact, or even approximately exact, result in delimitation at all. For it is a physical law which no amount of experience can evade or set at nought, that percussion does *not* operate directly downwards or in the direction of the impact *only;* but, in proportion to the strength of the stroke, laterally, diagonally, and in every possible direction in educing sound. And therefore, as I said before, deep percussion (so-called) is *necessarily* inexact percussion; and what you gain in volume of sound, by strengthening your stroke, you lose, and far more than lose, in definition,[1] according to a physical law which no amount of skill can overcome. To trace this principle out into a refutation of all the nonsense that has been written in books about the deep and superficial, absolute and relative, limits of certain organs according to percussion, would occupy too much time. I will therefore pass to one consideration only, which is very directly related to the subject of this clinical lesson.

"What I mean by a *carefully minimised* percussion-stroke is this: You are to percuss so as to elicit the distinctions of sound depending on air-filled or not air-filled viscera when superficially placed in reference to the abdominal wall; but you are not, as a rule, to strengthen your stroke beyond what is absolutely necessary for this purpose, at least when you are in search of objects such as the thin edge of the liver, which closely underlies the surface, or rather the wall of the abdomen.[1]

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[1] The introduction of Wintrich's hammer in percussion was, from this point of view, a great misfortune; and after using it for some years, more or less, from my earliest initiation into physical diagnosis, I abandoned it entirely on this account, except in eliciting the cracked-pot sound; because I found that the result of using it habitually was to cultivate a habit of too strong, and therefore inexact, percussion. Yet I found the hammer, in the hands of Traube and others, almost universal in Berlin in 1872.

"When your object is (as it may very well be) to determine not *limits*, but the qualities of large masses of sound as elicited by strong percussion, remember always that what is gained in volume is more than lost in exactness of delimitation; and that by no sort of management is it physically possible to determine accurately an edge, or limit, or any kind of definite form of an object, even half an inch below the wall of the thoracic or abdominal cavity under ordinary circumstances. Hence you can determine with tolerable accuracy the fact and the extent of a thickened omentum; but you cannot determine with like accuracy, by percussion alone, the enlargement of a mass of mesenteric glands; unless, indeed, they are thrusting aside the intestines, and (what is quite unusual in fact) thus becoming superficial. By using palpation along with percussion you can sometimes, but not always, distinguish the two conditions. About this diagnosis I have something to say further on.

"Meanwhile, observe the precautions which, in this case and in the other, we actually employed, and have reason to urge upon you as necessary in exploring the abdomen by percussion in search of thickening of the great omentum or any similar lesion. The first point is to determine the existence, or the absence, of gravitating fluid in such quantity as to affect separately the percussion. In this case our diagnosis on this point, by the quite ordinary tests, was in the negative. Then we had to consider that under normal circumstances the intestinal canal, in one or other of its divisions, occupies the whole anterior wall of the abdomen, giving rise to a well-defined, though not identical, tympanitic note, which is reached by a nearly equal force of percussion-stroke all over the anterior surface. If, therefore, we can find even a few points at which a very gentle tap elicits this normal quality of sound, we know that under like physical conditions the same gentle percussion-stroke, and no more, ought to elicit a more or less similar tympanitic note all over; and if it is otherwise, we ought to study the facts carefully in detail, and to know, if possible, the reason why. These points or areas of quasi-normal percussion afford us the necessary data, then, for what I call *minimising the stroke.* Now, if we find that over a particular area corresponding anatomically with the area of the great omentum, or of some portion of it, there exists a dull percussion which contrasts notably with the quasi-normal areas just referred to, being absolutely without sound to a *minimised* stroke, while to a very slightly stronger stroke it gives a tympanitic percussion quite like the quasi-normal areas, to what conclusion can we possibly come but that within this area of abnormal percussion there is something interposed between the abdominal wall and the air-filled intestines; something which is thick enough to differentiate the percussion, but not so thick as to give dull percussion to a stronger stroke; which is thus, as I expressed it in the report, 'easily penetrated' by percussion? And if this 'something' is in the anatomical position of the omentum, why should it not actually be the omentum, involved in a possibly more general peritoneal morbid process, but presenting (owing to its double fold) the changes due to this in a more marked form? And although this diagnosis may be confirmed and strengthened indefinitely by palpation, showing a diminution of elastic resistance over a like area as compared with other parts of the abdomen, it may, and often does, emerge with a fair amount of accuracy and security from the percussion alone, employed in the manner now described."

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[1] I have again and again been obliged to demonstrate to young and even to some skilful operators, that the lower edge of the liver has been shown by them as half an inch, or even an inch, too high, in consequence of the percussion-stroke not being carefully minimised.

The only circumstance which makes the remarks in this particular case of great value for my present purpose, is that it was one of many in which absolute accuracy of result depended in a very peculiar sense on the method employed; but it will be observed that the principles set forth as regards the importance of "minimising the stroke" have an application beyond the abdomen or the particular investigation referred to. It is these principles I am most anxious to maintain in this article, and therefore I shall endeavour in what remains of it to show that the differences above referred to between the Edinburgh and Glasgow schools in reference to percussion may possibly and indeed probably, involve questions extending to the fundamental basis of acoustic principle, on which insufficient stress has hitherto been laid. My object, in other words, is to show that wherever percussion is employed with a view to delimitation, a carefully minimised stroke (in the sense above defined) is essential to correct practice, and that it is vain to expect really accurate results unless this condition is systematically attended to. I am very far from persuading myself that the manipulations of experienced hands have not, in fact, led to fairly good results in a large proportion of cases; but for teaching purposes it seems to be most important that beginners at least should be started in the right line, and not involved in the intricacies of a terminology which is itself demonstrably out of accord with the laws of acoustics. When, for example, the expression "deep percussion" is employed, as it is by Piorry and others, and when it is thus made to appear that the deep limits of an organ can be indicated by percussion in similarly exact terms with the superficial areas, a positively wrong direction is given to procedure, and the results cannot fail to indicate in some cases the divergence from physical laws tacitly assumed in the process. There is indeed an apparent sacrifice in respect of the amount of sound produced, but the sacrifice is a necessary one, and is amply compensated by the greater value resulting from better methods. I would instance in particular the percussion of the heart and of the lower edge of the liver as being among those which in my experience have been most perverted or rendered indeterminate by the employment of wrong methods. I trust, therefore, that this article will be accepted in the spirit in which it is intended, not as a claim of priority or undue dogmatism, but as a simple attempt to set forth principles which have been apt to be lost sight of in daily use.

The discontinuance on my part of the habitual use of "Wintrich's hammer," as referred to in the footnote to the above, is a very marked and almost unconscious result of the principles referred to, the use of the hammer having been adopted by me at the instance of the late Professor Hughes Bennett not less than fifty years ago, on its being first imported into this country, and (notwithstanding the strong temptations to its use in class teaching) discontinued, as appears in the note, in everyday use, although always retained for certain cases in demonstration, at some time prior to the year 1872, after a prolonged and varied experience.

THE TREATMENT OF THE MUSCULAR, HÆMIC, AND MECHANICAL FACTORS IN HEART DISEASE.[1]

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(*Concluded from p.* 324.)

Lecture II.

In my last lecture I considered the influence of disorder of the visceral muscle and of the muscles of respiration upon diseases of the heart, and dealt shortly with the therapeutic agents at our command for assisting *that* muscular factor to recover its tone when lost. It was also stated, however, that the somatic or skeletal muscles of the body had an important influence upon the distribution and conduct of the circulation. In resuming our theme, it is with the *voluntary muscular system* that we are concerned. Every organ, be it brain, stomach, intestine, liver, kidney, or any other gland, which is in a condition of functional activity, is also in a state of more or less physiological congestion. It holds more blood than it does during functional quiescence. The heart itself may be seen shortly after food to contain more blood than during periods of fasting. In the case of single organs, such as the liver or stomach and intestine, the amount of blood diverted to them for the purposes of physiological activity would probably make little impression upon the general circulation, were it not that they are at the same time the receptacles for the food, and organs for its elaboration into a fit state for transmission into the blood stream. With the voluntary muscles, however, the case is different. Whatever the by-functions of these organs in the chemistry of the body, their main purpose is progression of one kind or another. They are the organs by the exercise of which man finds the means of subsistence on the planet to which he has been consigned, and by the aid of which he also protected himself from being devoured by other animals in the primeval forest, by the use of his hands or club, and by which he protects himself in the modern world, by means of his ironclads or Mauser rifles. His voluntary muscular system is, therefore, unlike his vegetative organs, a great part of his body, and its active physiological exercise diverts towards it a considerable portion of the blood, and has expressed by it again a large amount of lymph and blood into the general stream, which again feeds it. We can easily understand, therefore, how a careful and systematic exercise of these organs, with or without an associated kneading or massage of their substance, may both attract to them blood when abnormally accumulated in other portions of the circulation, and accelerate the current as it returns to the main channels. But, apart from this local influence upon the circulation, which is associated with the evolution of heat by the energy put forth, there is some dilatation of the peripheral vessels, and, of course, their filling with blood. Muscular exercise is also a direct provocative to an increased output of energy *on the part of the heart*. This takes place in proportion to the degree of force put forth by any muscle or group of muscles, to the duration of such work, and to the size of the muscle or group of muscles exercised. If the heart be auscultated during the execution of a muscular movement, it will be found in the first place to be quickened in rate, and if there be a bruit present, it may be heard to rise in pitch. On the cessation of movement the rate tends to fall, it may be below the average for a time, until it again reaches the average rate, and the bruit, if present, at the same time falls in pitch. These incontestable facts, therefore, declare that, by a careful and systematic exercise of the voluntary muscles, an influence can be exerted both on the distribution of the blood and on the action of the heart. What concerns us, as practical men, is to determine by what means and under what circumstances of disordered circulation these physiological conditions may be utilised for therapeutic purposes.

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[1] Lecture delivered at the London Polyclinic in February 1904.

General modes of exercise for hygienic purposes are of very ancient date. But, in the particular class of diseases with which we are at present concerned, William Stokes of Dublin appears to have been the first to modify the usual routine of the rest cure in cardiac weakness. His most notable disciple in more recent times was Professor Oertel of Munich, whose hill-climbing exercise was for a time in so much vogue. But, without special reference to the treatment of heart disease, the Swedish teacher of hygienic gymnastics, Henrik Ling, who was not a physician, laid the foundation of the more modern methods, in his systematic exercise of the muscles, for various hygienic purposes. It was by a special adaptation of Ling's exercises to the treatment of heart disease and their modification in some respects, that the late Dr. August Schott of Nauheim brought into more prominent notice the value under certain circumstances of resisted movements in increasing the power of an enfeebled heart. Ling's and Schott's manual-gymnastics have also been reproduced more or less in various mechanical instruments which take the place of the masseur or gymnast in carrying out the movements. These instruments are, largely, one or other form of lever in their essential nature, and the best known are the series introduced by Dr. Gustav Zander, by whose name houses in which these instruments are used are frequently still called.

While the mechanical instruments, intelligently used, serve every purpose just as well as the movements administered by a masseur, in fairly well-compensated cases, there can be no doubt that, in all cases of cardiac instability, in which compensation falls below a fairly high standard, the manual gymnastics are both safest and most useful.

The general effect of gymnastics of this kind upon the heart and vessels is shown in the pulse tracings of a case of fairly well compensated mitral regurgitation (Fig. 8).[1] These tracings were taken by myself with every care to avoid errors of instrumentation, which are very easily originated by the ignorant or careless use of the sphygmograph. But the lower tracing tells its own tale as a correct delineation of the physiological conditions brought about

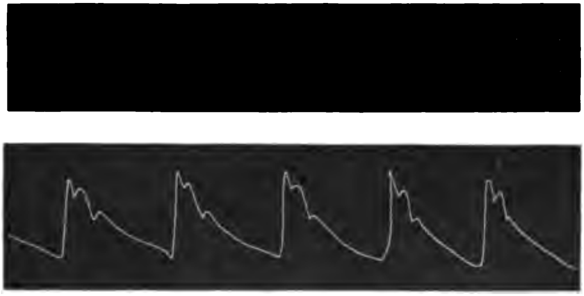

FIG. 8.

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[1] "Cardiac Failure," London, 1897.

by the exercises used, for it will be observed that not only is the height of the ventricular upstroke increased after exercise, but the whole size of the wave is also greater, and consequently the pulse rate less. Height of wave may be deceptive in a sphygmogram, but not pulse rate. This tracing is sufficient to illustrate the principle of increased cardiac power and fuller peripheral vessel brought about by the agency of physical exercise.

An important precaution which should always be inculcated in carrying out these movements is, that during the acme of resistance, the patient should avoid deep inspiration or restrained expiration. As we are aware, expiration is the propulsive phase of respiration for the systemic arterial system. This fact may be easily demonstrated by the sphygmograph. Such, then, are the principles and some of the details of the utilisation of the voluntary muscular system in aid of enfeebled conditions of the circulation, but it must not be concluded from its occasional beneficial employment that it does away with the necessity for rest and for the agents which we have seen act so helpfully on the visceral muscle itself, in very many cases. It is, indeed, only in minor degrees of cardiac failure, and during established convalescence from more serious trouble, that we can employ these measures either at home or abroad. The patient who can safely travel either to Nauheim or any other distant place, may safely use them, for if he can bear without undue fatigue the ungraduated movements of the journey, he may well survive and benefit from the graduated movements to which he may be submitted after he has reached his destination. But, what tends to cast discredit on any system of treatment, however rational, is the unmeasured laudation of such a method, and the attraction to a townlet, as to a therapeutic "Mecca," of many cases of cardiac failure which should under no circumstances have left their own homes, wherever situated. The eloquent fact, that cases which do best with graduated movements are those which least require cardiac medicinal agents, is a sufficient indication of the degree of failure which should be subjected to exercises. Digitalis and other agents may take the place of exercises ; exercises can never take the place of the pharmacological antagonists to dilatation, when these are imperatively called for. Speaking generally, then, the case of cardiac failure which demands digitalis should stay at home, and avoid both baths and exercises, but especially exercises. I have not gone into the question of baths on this occasion, although August Schott regarded them as a mild form of gymnastics, for they are probably more than gymnastic in their operation.

THE TREATMENT OF THE HÆMIC FACTOR IN HEART DISEASE.—The indications for the treatment of the hæmic factor in heart disease concern its quality, its quantity, and its distribution. The *quality* of the blood may be defective in its elaboration and its oxygenation, or contaminated by infective agents and processes. We are constantly reminded of the importance of a normal elaboration of the blood by witnessing the effect upon the heart, whether organically diseased or no, of various forms and stages of anæmia. Although it has not yet been demonstrated, it is possible that some graver forms of anæmia are dependent upon infective contamination, but the constantly observed anæmia of more or less overworked or improperly fed adolescents and young children, points to defective elaboration as the secret of the majority of the anæmic states with which we have to deal. Sufficient rest, simple but sufficient fare, and the well-known hæmatinics serve to remove the cardiac weakness due to such anæmic states. It is their resistance to these measures, their ingravescent deterioration, with distortion of the blood elements, and frequent termination in death, which serve to indicate the symptomatically termed pernicious anæmias. The essential cause of these is so imperfectly known at present, that we cannot speak very rationally of their treatment. It is interesting, however, that arsenic, which has at times proved of value in such cases, is also frequently needed as a stimulant hæmatinic in simpler anæmic states, before the latter will respond to treatment. Unlike simple anæmia, which so frequently affects the young, and is an imperfect development of blood, many of the pernicious anæmias occur in late middle life, and appear to be in some measure a senile degradation of blood. It is a disintegrant not evolutionary error. But this is theoretical.

During a recent debate on the treatment of cardiac failure at the Medical Society of London, Sir Douglas Powell dwelt upon the importance of a due oxygenation of the coronary circulation, and thus chiefly justified the use of oxygen gas as a therapeutic agent. He pointed out how the cardiac muscle was the first to receive the freshly oxygenated blood from the lungs, to which fact it no doubt owed much of its perpetual vigour. This point is not unimportant, and was discussed by myself at some length in articles on the neuro-muscular and hæmic factors in the circulation, which were published in the *Practitioner* some years ago, and I again referred to the point in 1897.[1]

In connection with pneumonic states, in which a considerable portion of lung is involved, and the function of the organ thus abrogated to that extent, I am inclined to agree with Sir Douglas Powell, that a moderate supplementation of the oxygen by the gas-cylinder is useful and beneficial to the heart's action, and indicated chiefly for the reasons stated. But we know that the blood can only hold a certain amount of oxygen, and that it does not exhaust the supply provided by the air we breathe. It is fortunate, therefore, that the poor who cannot afford the luxury of cylinder-gas are, in such straits, not much worse off than the rich who can, so long as the nurse can see the sky through the chimney, and knows how to open a window without freezing the patient.

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[1] "Cardiac Failure," London, 1897.

The question of *infective* conditions of blood, while most important, and from the investigation and knowledge of which we have much to expect, is still in its infancy. While we know already that certain organisms appear to be causative of endocarditis, clinicians have been disappointed in the result of the injection of anti-sera. It can scarcely be doubted, however, that a new era has been inaugurated in the treatment of heart disease by the introduction of these researches and attempts at serum-therapy, and in the future the preventive treatment of heart disease will probably bulk more largely than even the therapeutics of the mechanically disordered organ. But that time is not yet. The blood of every case of infective endocarditis, or accessible effusion in such, should, however, be carefully examined by a competent bacteriologist, and the case treated at least tentatively by the anti-serum of the organism, whether streptococcic or other, which appears to be primarily responsible for the mischief, if a culture determine this point. It should always be borne in mind, however, that whatever the primary causes of disease, the morbid state is ingrafted on the normal processes of life, and that in combating these morbid effects, we can never trust entirely to antitoxins or bactericidal remedies. Living structures must be soothed, stimulated, or supported by the valuable agents well known to us, and which will always have a recognised place whatever advances may be made in the bacteriological etiology of disease. This important truth is at times overlooked by the enthusiastic serum-therapist and bacteriologist, who is at present in the first flush of *sanguine* (!) expectation.

In the question of the management of the blood in heart disease, as regards its *quantity* and distribution, we have to deal with a matter more under our control. We can shed blood, if we cannot oust from its stream morbific influences. But this very shedding of blood is now to some extent a lost art. Like every other human effort that has engaged the thought and energies of man, it was overdone, abused, and discredited at one time, and the pendulum, high up in one direction, swung, as in all other cases, to the opposite extreme, where it is only now trembling, uncertain as to how far it may venture to swing back in the old direction. Notwithstanding its occasional advocacy in acute disease, it appears scarcely probable that blood-letting will ever be revived during the active prevalence of an infective agent. It is in the mechanical disablement of chronic states that it is most likely to be of service.

The quantity of blood circulating in the body has been estimated by physiologists to measure about $\frac{1}{12}$ to $\frac{1}{14}$ of the body weight, that is, an average man weighing say 10 stones will contain in his body from 10 to 11½ lbs. of blood. The capacity of the ventricles has been variously estimated, but they are each calculated to be capable of holding during life from 4 to 6 oz., while the auricles contain rather less. Taking the lower estimate, then, the heart may be considered to hold altogether about 14 to 16 oz. of blood in the average adult, at any given time and under normal circumstances. In dilated and weakened conditions of the organ of any duration, however, the accumulation in the cavities behind the left ventricle may be disproportionate. These are thinner and less resistant to distensive pressure than the thicker left ventricle. Examination of the heart after death in those who die of disease primarily affecting the left heart, shows that when death has supervened *gradually* the greater amount of blood is accumulated in the right side of the heart, the intervening engorged lung adding an element of asphyxia to the situation. When, however, the demise is *sudden*, it is the left heart which fails, and it is then frequently a very striking phenomenon to observe how little overdistension of the venous chambers is met with under these circumstances.

The total quantity of blood circulating in the body may, of course, be reduced by diminishing the quantity of food and drink taken by the patient, while its accumulation in the venous section of the circulation, the right side of the heart, and the tissues, may be lessened by venesection, leeching, and tissue drainage, as well as by action on the intestines. The object of venesection, however, is not so much to reduce the total quantity of blood, as to relieve for a time the distensive pressure of abnormal accumulation in the right side of the heart; and the cases which show the most striking results of venesection in practice are those in which the right heart and venous system are most engorged. Sudden relief of the *left* heart is best brought about by bleeding the patient into his own vessels by the use of the nitrites. It has been argued that dextro-cardiac depletion is difficult to effect, because a little food and drink, and absorption from the tissues, soon re-establishes the previous condition. But, as I have said, the object of venesection is temporary, and to allow distended cardiac muscle with depressed irritability to recover tone under the influence of appropriate stimulants. That the mechanics of the circulation render this possible, cannot, I think, be doubted, but personally I have greater faith in the efficacy of venesection for this purpose than of leeching, and this because of the greater rapidity with which blood can be withdrawn by venesection as compared with leeching. That blood-letting under suitable circumstances may not only relieve a patient, but actually save life, is a fact which can only be called in question by those who have not had experience of a condition for witnessing which opportunity frequently presents itself. The sceptic without experience is frequently very positive, and it is usually hopeless to argue with him.

As regards the quantity of blood which it may be advisable to withdraw by venesection, we must be guided by the degree of turgescence and the size of the patient. Less than 8 oz., which is equal to the average contents of a more or less dilated right heart, is of little effect as a rule, and as much as a pint may in some cases be lost with benefit. How much blood a patient may lose and yet survive is difficult to estimate. Something depends on the personal factor, but those of you who have had experience of obstetric practice must have been astonished at times to observe how much may be lost under these circumstances with comparative impunity. But we may have to deal with a depleted heart, and it may be our duty to throw fluid into the circulation, not take blood out of it. In such cases, the method to be adopted must depend upon the circumstances of each case. If it be necessary to replenish the circulating fluid rapidly, intravenous transfusion of the normal saline solution must be practised rather than intracellular or rectal injection. There appears to be a certain analogy between the methods of filling and emptying the vessels—intravenous transfusion corresponding to venesection, and the other and slower method to leeching.

THE TREATMENT OF THE MECHANICAL FACTOR IN HEART DISEASE.—By the mechanical factor in its influence upon treatment, I mean the effect of lesion in a particular valve, or in more than one valve, and that of pericardial obstacles to the perfect action of the heart. There are those who maintain that under any circumstance in which the propulsive power of the heart is diminished, the digitalis group finds ample employment. But this view is not shared by others, who regard certain lesions as more or less prohibitive of its use. Adherents of either view, like opponents in all else, may assume too uncompromising an attitude, and in doing so err, for the truth in human calculations has a way of standing aloof from extremes.

Let us shortly consider what the underlying conditions for the successful use of the digitalis group are in essence. It is manifest that to propel a normal quantity of blood from the heart, there must be facilities for a normal quantity entering and leaving it, and it must also have the wholesome footboard of competent valves to facilitate the bound forward of the blood under the contracting chambers. Now, digitalis will help the chambers to contract, and in doing so to some extent render more efficient the defective valvular footboard for the hæmic spring, but its action is, of course, upon the cardiac muscle and not directly upon the valves. If, therefore, there be valvular conditions which either obstruct too much the forward movement of the blood, or afford too imperfect a footboard and resting-place for the projected column, the agent capable of assisting the circulation under certain average circumstances may fail under these, and few failures are innocuous. What does not succeed in its object, when that object is beneficent, usually entails disaster of one kind or another. The footboards in the circulation through the heart are the tricuspid and mitral cusps, and the resting-places for the projected columns of blood the pulmonary and aortic valves. It follows, therefore, that there may be degrees and combinations of abnormality in these situations which render the action of digitalis, act it never so energetically on the cardiac muscle, ineffective or harmful, and therefore that the mechanical factor has a bearing upon the success or failure of treatment. The normal evacuation of a hollow organ, in other words, depends upon the extrusive power of its walls and the facilities existing at the exit, for the extrusion of the contents. Something may be learned as to the mechanical conditions most favourable to the use of digitalis by a consideration of those most favourable to the action of ergot in the case of the hollow muscle upon which the latter drug specifically acts. All those who have had any experience of obstetric practice recognise that a dilated or dilatable uterine orifice and a pelvic channel unencroached upon by irremovable impediment, are necessary to the safe use of ergot. Uterine failure and even rupture is not unknown where these important considerations are overlooked. The failure and possible mischief capable of being inflicted on a labouring heart, are on somewhat analogous lines. The physical conditions of the circulation on the right and left side of the heart are, however, *not* identical. The uterine analogy is more applicable to the left than the right heart; for on the right side propulsion is more directly favoured by pulmonary action than on the left, and it is on the left that the vast majority of hearts fail. The condition of the aortic orifice, therefore, is of prime importance in determining the probabilities of a successful use of that *cardiac ergot*—digitalis. If that orifice be greatly obstructed, digitalis is more likely to be injurious than beneficial, for to spurt up a hill is to exhaust the force which may make up time down hill or on the level. If the aortic orifice be greatly obstructed, belladonna, strychnine, and the nitrites are more useful than the digitalis group. But if the obstruction be moderate, digitalis acts very well. How are we to determine this point? It is a question of the degree of lesion. The bruit is of little use except for the *diagnosis* of lesion. The degree of hypertrophy or dilatation may be indistinguishably simulated by the consequences of other defects. The volume and character of the pulse are, I believe, the best guide to the determination of this point. A small pulse, regular, and of fair neural tension associated with a systolic aortic bruit and an hypertrophied organ, are tolerably certain indications of a dangerous degree of stenosis, and experience teaches us that under these circumstances, digitalis, if used, may have to be abandoned. A picture of such a case from a patient, who was a man 43 years of age, and under my care at the Great Northern Central Hospital, is shown in Plate V., Fig. 9. In this case, digitalis was used tentatively and abandoned, as it appeared to aggravate the embarrassment of the circulation. Another similar case of an elderly woman whom I had an opportunity of treating from time to time over a series of years, and who was subject to angina pectoris, lived a quiet life fairly comfortably, by the occasional use of nitrites. This case was also ultimately examined after death, and the aortic valves were found to be reduced to a mere triradiate-chink, and driven dome-like into the aorta. But if, with an aortic systolic bruit, and the signs of cardiac failure, there be a fairly full pulse, digitalis may frequently be used with benefit. The point is difficult to settle, however, in many cases without actual experiment.

To contrast with the sphygmograms of extreme aortic stenosis just shown, I now show the tracings from a severe case of cardiac failure with double aortic lesion which did well with full dose of digitalis (Fig. 10). It will be observed that the volume of blood reaching the radial artery was much greater in this than in the stenotic case; not because the case was better compensated, but because the aortic orifice was less obstructed.

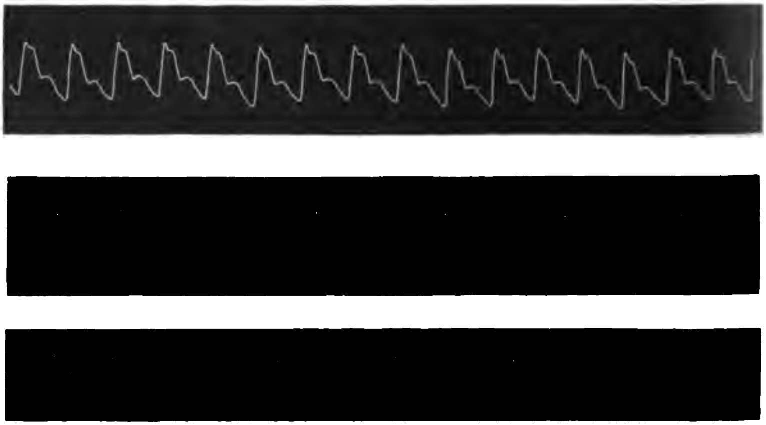

FIG. 10.

There was long, and is still, a well-founded prejudice against the use of digitalis in aortic regurgitant lesions under certain circumstances; but this does not apply to cases uncompensated in any notable measure. Such develop what have come to be termed mitral symptoms. That is, the evidence of mitral incompetency due to dilatation of the ventricle, and consequent want of arterial tension, with irregularity of the pulse. Not only the aortic resting-place, but the ventricular footboard is defective in such cases, although the exit of blood from the heart may be comparatively unimpeded. The fear of regurgitation into the ventricle as a dilative force under slower action of the heart, has deterred many from using digitalis sufficiently under these circumstances, and I confess that for long I shared this fear. But experience has caused me to modify my opinion, and I now regard with gratitude the late Dr. George Balfour's bold teaching on this point.

Coming now to mitral lesions, with a normal aortic orifice and normal aortic valves, there is, I think, a general and well-founded belief that mitral regurgitant lesions, and mitral constrictions of a moderate degree of narrowing, are those which give the most gratifying results under digitalis when cardiac failure is associated with these conditions. It is obvious that these are just the states which best fulfil the requirements for a beneficial action of the digitalis group. They are those which best allow blood to enter and to leave the ventricular chamber. But it is no unusual experience to find that there are cases of mitral stenosis which do *not* respond well to digitalis, and in these it is my belief that it will generally be found that the degree of constriction is such as to impede too greatly the entrance of blood *into* the left ventricle. Digitalis under these circumstances, by still farther reducing the capacity of the unfilled ventricle, appears to limit its absorptive power and allies such cases to those of *dextral* valvular disease, in which that drug does not act so well. In such cases, as in those of excessive stenosis at the aortic orifice, belladonna, strychnine, and the nitrites are more serviceable.

Chronic dextral valvular disease of non-congenital origin is rare, but it may be met with in very pronounced degree. I have had experience of such, and have found under these circumstances that the digitalis group does more harm than good. Opinions may differ as to why such cases should be unsuitable for treatment by the digitalis group, and experience of them is perhaps too limited to allow of dogmatism, but I am inclined to the belief that the reason for this clinical fact is the same as that which militates against the successful use of digitalis in cases of an excessively constricted mitral orifice, namely, that the *vis à fronte* of left ventricular absorptive power is unduly diminished by the action of that drug on a comparatively empty chamber.

The comparative uncertainty of precise diagnosis in congenital malformations of the heart renders the use of digitalis in this class of case always tentative, and it is frequently altogether prohibited.

The intermediate pulmonary states, such as pneumonia and emphysema, which produce the vascular phenomena of asphyxia, appear for the same reason to be unsuitable for treatment by the digitalis group. The left ventricle in those dying of pneumonia, and who have no disease of the heart itself, is found after death to be an empty and contracted chamber.

It is scarcely necessary to dwell at length upon the additional disability imposed upon intracardiac mechanical difficulties by extraneous impediment such as a pericardium adherent at once to the heart and to the organs and structures outside it. It is under such circumstances that, as a rule, the greatest amount of muscular hypertrophy of the heart is found—an index to the greater labour imposed upon that organ. It is my belief that in the future a certain—perhaps a limited—number of these cases will be dealt with surgically, with the object of freeing the heart so far as possible from extraneous tethering. But such methods are not yet within the sphere of practical medicine, and need not detain us longer now.

X-RAY THERAPEUTICS.

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The physics of the X-ray are, beyond their general bearing on science, of little practical interest to the physician; their physiological effect, on the other hand, is of great moment; still, some slight appreciation of the physical laws governing them should be understood.

Since the discovery of radium, and the similarity of some of the emanations from that body with the X-ray, it appears as if their origin in the latter case might be of a similar nature. The highly charged molecules of air, flying with enormous velocity from the cathode and impinging on the platinum disc, are there by their impact destroyed, their energy being liberated as heat and the X-ray. If such were the case, we would expect the vacuum tube to alter in resistance, becoming more and more rarefied in proportion to the discharge passing through it, which, as is well known, is the case.

If the rays arise at the anti-cathode, then that point should be taken when estimating their relative intensity at any distance; and, further, it should obey the law of inverse squares. If, therefore, an adequate exposure at 10 in. from the anti-cathode is, say, five minutes, at 20 in. it should be twenty minutes, and so on. In practical working this appears to hold good.

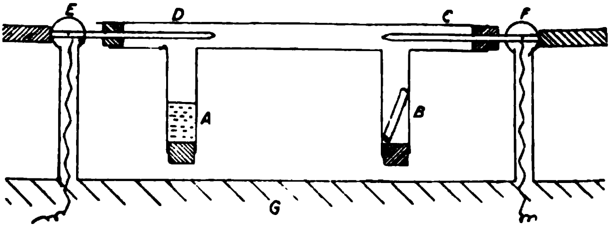
Again, if the anti-cathode is, so to speak, the actual seat from which the rays emanate, and are in no way associated with reflection from the anti-cathode, then we would expect the field to be of uniform intensity, as can be shown by exposing photographic plates in different portions of the field at similar distances, the plane of the plate being at right angles to the axis drawn from the anti-cathode. The rays, however, arise from the upper aspect of the platinum plate, and hence the intensity of the ray in the reverse aspect of the tube will depend on two factors—(1) The thickness of the plate; and (2) the penetrating power of the ray; for to be visible on this side they must first traverse the platinum disc.

In the practical working of any set of apparatus, for therapeutic purposes, it is advisable to maintain, as far as possible, an absolute constancy. As will be understood, there are two circuits to consider—the primary and secondary. It is usual to vary the rate of interruptions, if a motor brake is employed to regulate the ampèrage passing through the primary coil. This leads to a physical fallacy, for, owing to the corrosion of the iron paddle in the mercury brake, the duration of the current becomes diminished, and we make up for this loss by increasing the frequency of interruption until the ampère meter registers the same. It would be much more scientific to compensate for the wearing of the paddle by raising the level of the mercury. Accumulators, kept well charged, are much more constant in their supply than if the current is taken from the main by means of some transformer.

The secondary circuit presents a much greater difficulty, for here we have an indispensable variable factor, namely, the tube, which not only tends to increase in resistance from time to time, but also, owing to alteration of temperature, during any individual exposure. It is advisable, therefore, so as to guarantee some amount of uniformity during any individual exposure, that the tube should not become hot. This has the additional advantage that, if the tube be used in this way, its life is greatly prolonged.

To compensate for the general tendency to rise, some form of tube should be used to which a regulating mechanism is attached by means of which the vacuum can be lowered.

It is inadvisable to use the screen and one's hand to judge of the penetrating power of the rays—(1) On account of the lack of an absolute standard, and (2) the danger to one's self. As the intensity of the field depends on the resistance of the tube, the following little contrivance is absolute in its standard, and certainly not dangerous to the operator:—



As will be seen from the accompanying diagram, it consists of a glass tube 1½ in. bore, through the ends of which the discharging terminal of the coil are thrust and fixed at a distance from 4 to 6 in. apart. From the glass tube are two small receptacles; in one is placed sodium hydrate, and in the other pyrogallic acid, which absorb the moisture and any ozone that may be formed.

It will be at once seen, bearing in mind the fact that an electric discharge takes the path of least resistance, that if the resistance of the X-ray tube is high, a continuous discharge will occur at the terminals of the coil; or if they are fairly equal, the discharge will take place through the tube or between the terminals, according to the physical conditions at any particular moment. The terminals being placed at a certain distance apart, the tube is now manipulated until an occasional spark passes between them; and, having once found a convenient arrangement, which gives efficient results, it should be maintained for every subsequent exposure. Keeping everything constant, and varying only duration and interval of exposure, it is surprising how accurately the effect of any series can be gauged.

Considerable discussion has arisen from time to time respecting the immediate agent upon which the action of a focus tube on the skin depends. Some point is lent to such discussion from the superficial character of a reaction; and, further, the fact that the surface of entry and exit only are affected, the latter to a much less extent than the former. This is not, strictly speaking, true, though mainly so in most cases, for a chronic form of periostitis, with thickening of bone, has been observed in a case where the only cause that could be found was a prolonged exposure to a focus tube.

It appears probable that, though the X-ray itself is the factor in this curious physiological reaction, still the electro-static condition of the tube plays a minor part.

The reaction produced by the former, when the part exposed is shielded by being covered by moist lint and thus earthed, is extremely delayed in its appearance and slow in development; whilst that produced by the latter is rapid in its appearance and is often accompanied by blisters, a thing which is never seen in the true X-ray reaction. It is therefore advisable, when using these potent physical agents for therapeutic purposes, that each should be used separately and not both together, so that a more accurate appreciation of the effect may be obtained.

It appears as if two factors, *i.e.*—(1) Avascularity, and (2) the opacity of the tissue concerned to the passage of the rays, are concerned in the production of a reaction. Epithelia, however, where the reaction is usually most manifest, beyond being avascular, also are only found lining free surfaces; and it may be stated that this curious localisation of the reaction is due to this fact; on the other hand, it is scarcely correct to call the root of a hard follicle a free surface. Yet the actual lining epithelium is avascular. Again, it is possible, by exposing the cheek, to set up a condition in the nostrils resembling a most severe catarrh; and here there is always a covering of mucus which is constantly changing, so that the epithelium is not a free surface in the physical sense. Further, the action of those rays on tuberculous nodules and acini of cancer cells, which are essentially avascular, is suggestive. The action of a circulating fluid arises, in all probability, through the rapid removal of some deleterious products which this physical agent tends to produce.

One characteristic feature of the reaction is its marked latency. As to how far this latency is due to the rays themselves, their mode of application, or the peculiarities of the tissues acted on, is difficult to determine. From my own experience, differences in the duration of the latent period are almost entirely due to variations in the intensity of the ray, and lack of uniformity of the accessory details of application; and I feel convinced that, given a certain intensity of ray, applied over a given period, the result will be fairly uniform in all cases. It is often noticed that, when complete necrosis of the skin has followed a prolonged exposure, healing may occur up to a certain point, and then stop; or, even if complete healing does take place, the scar never contracts, provided, of course, that no subsequent infection leads to any serious loss of tissue. These curious features arise from the superficial nature of the burn, the epithelium only being lost, and the dense fibrous matrix, the cutis vera, remains intact; contraction of a wound only occurs when this is destroyed; hence it may arise, if an extensive area of skin is removed, that the epithelium may not have the potential power to cover the whole denuded area; in such cases, the rational procedure is to graft skin on, which, in my experience, takes remarkably well.

Taking a broad view of the whole phenomena of a reaction, there appears to be nothing which is in any way atypical, and such peculiarities as do occur are due to the peculiar nature of the agent rather than to any specific action. One might look upon it as presenting all the ordinary features of an inflammation, the various stages of which are greatly prolonged.

A curious condition, which anyone who has had any experience with focus tubes must have met with, is sometimes noticed, where, after even one exposure, an intense painful swelling appears at the seat of application. It is doubtful whether this is directly due to the rays themselves, or due to some other physical agent. In some cases, and apparently only in those where the skin is broken, as in lupus, the whole phenomena and constitutional symptoms resemble those of erysipelas. There can be no doubt that not only do the rays damage normal skin, but may even cause changes in granulation tissue to such an extent that, supposing the presence of the specific bacillus, and a suitable constitutional condition of the patient, a typical attack will follow. The simple presence of these bacilli is not sufficient, and it is necessary that the rays may so alter the condition of the granulations as to allow their passage into the tissues themselves.

Examinations of sections of area that have been under the influence of the X-rays, present two separate appearances.

In one, the epithelial cells appear to undergo a form of cystic degeneration, and finally disappear; in others, the epithelial cells appear to be invaded by leucocytes, the surrounding vessels being dilated, showing active signs of inflammation; it is probable that the above are stages of the same process.

Now, it is a well-known fact that epithelium has an inhibitory action on the transudation of leucocytes through the capillary wall, as is shown by the effect of grafting small bits of skin on to the basis of a granulating ulcer. Further than this, leucocytes have not the power of invading or passing through epidermis, be it only a layer a few cells thick; nor do we ever see these same cells in epithelial nests of a malignant growth; hence, therefore, the presence of leucocytes in an epithelial nest shows that the cells constituting the nest must have undergone some previous change, the surrounding tissue remaining normal.

The rays, therefore, must so alter the *statu quo* of these malignant foci, as to enable the surrounding tissue to obtain the upper hand, and so absorb them; after which the ordinary process of healing takes place.

Lupus.—The X-ray has, as has been shown on numerous occasions, a most beneficial effect on lupoid ulceration, though, everything considered, we must look upon it as a somewhat clumsy method. It is almost impossible to so direct the rays as to affect diseased areas only. It appears to differ also in its sphere of usefulness from the Finsen light treatment; for, whilst the former has most beneficial effect on ulcerative forms of lupus, the latter is *par excellence* the better for the drier forms. When a mucous membrane is infected, the rays naturally can only be used, as the conditions necessary for the Finsen light cannot be produced. Both these methods are in some respects better than scraping, where time and patience are at one's disposal, both on account of the beauty of the cosmetic result produced, and comparative freedom from recurrence. Unfortunately, recurrences are by no means unknown. Even after treatment with X-ray or Finsen light, about 25 to 50 per cent. of the cases return for some further recurrence. This percentage of recurrences seems to become less and less as time goes on. The severity of the treatment seems to vary, according to the operator, and it almost appears as if the chronicity of the case should regulate the treatment. The longer the duration and the drier, the more severe reaction is necessary. Under no circumstances should the reaction be carried beyond an erythema, for if a burn is produced, the cure becomes more severe than the disease. One must admit that when a burn has been produced, and healing has fortunately occurred, the cure is remarkably permanent. On the whole, therefore, Finsen light is the more serviceable agent for the cure of lupus, and only in certain selected cases should the X-ray be used.

Malignant growths.—There can be no doubt that malignant growths can be influenced by the X-ray, but whether this method of treatment is advisable is quite another matter. Bearing in mind the superficial nature of the influence of this agent, and further, the diffuse and uncertain nature of secondary deposits, one cannot conceive how anything of a beneficial nature can be expected from this method of treatment. Rodent ulcer, though undoubtedly a malignant growth, on account of its superficial character and absence of secondary deposit, naturally falls within its sphere of influence. Sarcomata, if the theory given in the foregoing pages is correct, should not, on account of their vascularity, be in any way affected. If the growth is more chronic and less vascular, as in the spindle-celled variety, some influence might be expected. Actual clinical experience seems to bear out the above supposition, though the extent of such benefit is scarcely sufficient to justify treatment on these lines. The use of the rays in hopeless cases does certainly seem to relieve pain, though for expediency and efficiency it cannot be compared to a hypodermic injection of morphia. In rodent ulcer, therefore, it has its greatest sphere of usefulness, and certainly produces a very soft and almost invisible scar. Recurrences unfortunately occur in nearly 50 per cent. of the cases supposed to be cured by this means, a percentage which is greater than in those treated by the knife. Further, operation is quick and in the end less expensive; so that, taken altogether, even in this form of malignant growth, whose characters are exactly suited to the sphere of influence of the rays, they have a very restricted value.

Perhaps, where the patient is too feeble, or the growth too extensive for removal, or has recurred repeatedly after removal, the rays find their true use.

In other conditions of the skin, such as eczema and *tænia sycosis,* we have most remarkable and rapid results; in the former, however, relapse is almost inevitable, while in the latter the result appears to be permanent. It is possible that a chronic eczema, treated by those means and associated with local applications and constitutional means, may, in selected cases, give good results. Lately, in leucocythæmia, marked benefit has been achieved by gentle X-ray treatment; and, according to reported cases, the spleen has diminished in size to a remarkable degree, the constitutional condition of the patient becoming much improved.

ON A CASE OF DEATH DUE TO OBSTRUCTED LABOUR.

By JOHN BENJAMIN HELLIER, M.D. (Lond.), *Hon. Obstetric Physician to the Leeds Infirmary and Lecturer on Gynæcology in the University of Leeds.*

THE writer here records the only case in which it has fallen to his lot to see a patient die, shortly after delivery, in consequence of obstructed labour and protracted artificial delivery, in which there was no laceration of the genital canal and no post-partum hæmorrhage. No new facts or theories are involved, but the case illustrates and enforces the recognised principles of obstetrics in regard to obstructed labour in a way that is interesting and monitory. He owed the opportunity of dealing with the case to the fact that he holds office in a large hospital to which desperate cases are liable to be sent from a wide surrounding area. Cases such as the one described are rare, and published reports of such are, for obvious reasons, rarer still.

CASE.—The patient was a married woman, æt. 34, mother of ten children, some of them twins. She was not one of the Infirmary's extern maternity cases, but she was admitted at the request of a practitioner at some distance from the Infirmary, who informed us that attempts had been made for three hours to deliver her by forceps, under ether, and that the forceps had slipped, and that he could not turn. He added that in a long experience of midwifery he had never been so baffled before. How long she had actually been in labour was not stated. She was a stout woman, with congested face. The abdomen was very large even for pregnancy at full term, and its walls were thick. On vaginal examination, the head was found impacted at the pelvic inlet. The os was fully dilated. The vertex presented with the occiput posterior. The pelvis was slightly flattened, but the conjugata vera was not less than 4 in. In fact, there seemed on first examination no obvious reason why one should not be able to deliver her with forceps. But the condition of the patient was exceedingly bad. First and foremost, the pulse was at least 160, and extremely weak. Respiration was hurried, the vagina was hot and dry, and the external genitals were swollen. The uterus felt very hard, and the fœtal parts were not to be made out through the abdominal wall.

The opinion given at once was that it was possible that the patient might die before we had delivered her. For her condition was a typical illustration of the results of prolonged obstructed labour. There was *tonic contraction of the uterus*, and its concomitant symptoms of great and increasing exhaustion and threatened heart failure. It was about 12.30 A.M. when she was admitted. Strychnine was administered hypodermically at once. As the forceps, which had been previously used and had slipped off, were ordinary long double-curved forceps, we first applied the axis-traction forceps, which experience has proved will often succeed when others fail. They did not slip here, but we were quickly satisfied that no amount of force that could be safely employed would make the head descend. The head was next perforated, and this it was fully expected would end the difficulty. But this expectation was very far from being realised. The head was seized with the cranioclast and reduced in size, but with as much force as we dared to use no progress was made, and it was evident that the head itself was no longer taking part in the obstruction. Exploration was now made by the introduction of the hand to try to determine the nature of the obstacle. It was possible that fœtal ascites, or some fœtal tumour or double monstrosity, might be present. Nothing, however, could be discovered, except that the child was very large, and the tonic contraction extremely marked. A foot was, however, within reach, and it seemed a good plan to draw this foot down; version in a tonically contracted uterus is usually to be avoided, but with a collapsed head the objection was less, and the fœtus had to be delivered somehow. To grasp and pull down this foot, lying, as it did, high in the rigid uterus, was extemely difficult, and was accomplished at last with the aid of the craniotomy forceps, which were applied to the foot. The second foot was with almost equal difficulty brought down also, and even now the trunk refused to follow. The abdomen was next perforated to relieve any possible ascitic accumulation, but none was found. At last, by bandaging the ankles to a traction bar, delivery was completed at 2.50 A.M. Mr. (now Dr.) H. Wales, who was assisting in the delivery, was a stalwart member of the University Rugby football team, and we had no lack of muscular power, but neither of us will soon forget the protracted struggle which this case required.

The causes of the difficulty were now obvious. First, the child was of enormous size. It weighed 12 lb., after craniotomy; secondly, there was slight flattening of the pelvis; thirdly, there was an extreme degree of tonic uterine contraction, so that the large fœtus was grasped round head, shoulders, and hips as by a vice. After the birth of the child we waited nearly an hour for the placenta, and then delivered it manually at 3.45 A.M. There was very little hæmorrhage. During delivery the patient received 5 pints of saline solution by intravenous injection. She had a little ether from time to time, but not much. After delivery the pulse was very rapid and feeble. The patient was cold and somewhat livid, and there was cardiac dyspnœa. So far as one could tell, there was no laceration of the soft parts. After removal to bed, strychnine was injected, and saline injections were given per rectum, with stimulants; and other measures were used. She died about 7 A.M. Unfortunately, no post-mortem was obtained.

The foregoing case illustrates, in the first place, the consequences of persistently obstructed labour. The consequences are, the production of tonic contraction of the uterus, with progressive exhaustion of the patient, and death, if the obstruction be unrelieved or relieved too late. So far as we know, the first good account of this condition will be found in a paper by Braxton Hicks.[1] Herman in his work[2] has a terse and forceful description of the condition of the patient and the uterus in such cases. The uterus becomes hard and tender, and is in a state of tetanic contraction. It is said that, in fatal cases, the contraction persists till death. Braxton Hicks[1] says that he once saw a patient with an arm presentation who had been in labour nearly a week, three attempts to turn having been made. The uterus was firmly contracted.

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[1] *Trans. Obst. Soc. London*, vol. ix.

[2] "Difficult Labour."

The symptoms manifested by the patient are, first, rise of pulse rate with hurried respiration, anxious expression, restlessness, and great weariness. The vagina becomes hot and dry, and the external genitals are swollen. Vomiting may come on. The patient may become semi-conscious and delirious, the tongue grows dry, and a general "typhoid" condition may result. All the while the pulse becomes faster and weaker. Uterine rupture may occur, or necrotic changes in parts of the genital tract. It is plain also that prolonged or repeated ineffectual attempts to deliver will cause increased shock and exhaustion. Finally, the pulse becomes imperceptible, and the heart stops.

Such a picture as this must be almost unknown in its completeness to the British practitioner of to-day, but must have been all too common in the days before forceps. What the practice of obstetrics must then have been, it is hard for us to realise. No wonder that a feeling of special dread was associated with child-bearing at a time when, for obstructed labour, there was nothing but the clumsiest artificial aid, with no anæsthetic to mitigate the suffering, when methods of malpraxis, almost inconceivable to us, were in vogue, and all undertaken in a manner which defied every rule of asepsis. That the Anglican Litany, dating from the sixteenth century and founded upon litanies used for centuries before, should contain a specific petition for "all women labouring of child," is not a cause of wonder.

In the second place, this case illustrates the importance of recognising the conditions under which the use of forceps becomes futile or harmful. There is no worse method of treating an obstructed labour than to make prolonged and violent efforts to drag down into a pelvis a head that will not safely come, or will not come at all. Such efforts injure and exhaust the mother. Moreover, they do not save the child. If the child be not killed outright, but be, as sometimes happens, dragged through a narrow pelvis by extreme force, there is a very serious possibility, a dreadful possibility, that the child may live in such a maimed condition that its death were preferable. Our school inspectors are drawing our attention to the number of mentally defective children. A large number of these present a characteristic type. Spastic paraplegia prevents them from walking, and renders their hands useless. Their speech is inarticulate, their mental state more or less idiotic. They will never earn a penny towards their maintenance, and will remain a permanent burden on their parents or on the public charges. Such cases are due to cortical hæmorrhage, caused by birth injury of the head. It is well to bear in mind the disastrous possibilities in regard to the child, as well as the mother, when one is tempted to pull the forceps with all the strength at command.

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[1] *Loc. cit.*

Sometimes diminished pelvic measurements afford clear counter-indications to the use of forceps, but in cases like the present, where there seems to be at first no obvious reason against their success, it is much more difficult to form a right judgment in making traction. Two points then arise, *How strong?* and *how long?* How much force may be exerted in a difficult case without undue risk, and how long may efforts to deliver by forceps be continued? We are not aware that anyone has yet determined how great the maximum of safety is.

Galabin tells us[1] that one man of not great power may have to put forth his full strength, and it is legitimate for him to obtain counter-pressure with his foot against the bed. Two men should not unite their strength to deliver.

Dakin considers[2] that a man of ordinary strength should not put forth his full strength for more than a few seconds at a time, and that this effort should not be repeated more than two or three times, or very considerable damage will be caused to the mother's parts as well as to the child.

Being anxious to know what amount of force is likely to be employed by a practitioner of average strength, who under such circumstances pulls "as hard as he can," the writer has made some observations with a dynamometer. This, fixed to a post, was placed in a horizontal position at about the height above the ground at which the forceps are usually applied, and the traction-handle of a pair of axis-traction forceps was attached. Traction was made first by an operator sitting on a chair without any special foot purchase; then he was allowed to put one foot on the floor against a resisting point; and finally he was allowed to assume any position he liked, the best one being to sit on a chair and raise the two feet to the line of traction and fix them against the low table on which the dynamometer was secured. Various medical students and others took part in the experiment.

The conclusions the writer has drawn are, that an ordinary man sitting by the bedside and taking no special purchase with his foot will not pull more that 70 or 80 lb. If he fixes one foot on the ground, level, he will pull 100 lb. or more. If he puts one or both feet in the position of greatest mechanical advantage, he may reach 200 lb. and upwards. Our stronger men exceeded the maximum indicated by the dynamometer (260 lb.). It is assumed that, in actual practice, sufficient counter-traction is made to

[1] "Midwifery," p. 625.
[2] "Midwifery," p. 384.

steady the patient, also it is certain that the forceps would slip off before the highest figures were reached.

In the writer's opinion, 70 or 80 lb. is a good strong pull and should deliver ordinary forceps cases. When 100 to 110 lb. is exceeded, the point of danger is not far off, and probably 150 should not be exceeded. This limit is, however, little more than a guess.

As a matter of fact, experience acquired by the practitioner must always be his main guide. For the young practitioner who has not such experience, the best and simplest plan is to obtain the opinion of an older man or expert in a difficult case. We only wish that in England there were large indoor obstetric clinics, where in a short time the student could see many illustrations of the difficulties and complications of obstetrics. Most of us have acquired our knowledge by slow degrees, during many years of practice, and at the cost of some mistakes.

As regards the length of time during which attempts to deliver should be continued, the essential thing is to keep watch upon the general condition of the patient, and be quick to note the first signs of exhaustion and threatened tonic contraction; continued traction will often overcome great difficulties; but the signs referred to should inform us when it is proper to discontinue traction and to resort to craniotomy or Cæsarean section.

It must be said candidly that if, in the case in question, it had been recognised in due time, that delivery was not to be accomplished by forceps, and if craniotomy had been performed, the uterus would not have taken its rigid grip on the fœtus, and delivery would have been accomplished without an extraordinary degree of difficulty. It must not be concluded that the practitioner who sent us the case was wholly responsible for the treatment. We do not know how long the patient had been in labour or during how much of the time she had been under his own observation and treatment. Speaking in the abstract, there is no doubt that extreme degrees of tonic contraction and exhaustion are preventible by timely operative interference.

The varieties of obstructed labour are many, the symptoms resulting are essentially the same. It is not within the scope of this paper to discuss the operative measures by which the obstruction in each case may be dealt with. But the question arises, as to whether in the present case, if one could have foreseen the protracted and exhausting nature of the measures necessary for delivery, after admission, it might not have been a better plan to deliver at once by Cæsarean section. So far as the question of shock and exhaustion is concerned, a great deal might have been saved in this way. At the same time, it must be remembered that while Cæsarean section, performed before or at the first onset of labour in a patient in an aseptic state, is now a highly successful operation, Cæsarean section, performed on a patient in a state of extreme exhaustion, with a genital canal infected by prolonged manipulation, with defective aseptic precautions, has a terrible mortality.

Recently, the writer has had the opportunity of observing a case in point. A woman was brought in in labour, in an exhausted and desperate condition. The pulse was 180 and almost imperceptible. The feet were presenting. Prolonged and vigorous efforts had been made to deliver by traction on the feet. The pelvis was not obviously contracted, and the cause of obstruction was obscure. It seemed doubtful if she could survive delivery. It was perfectly clear that further pulling the feet would be worse than useless. Therefore, the patient having been transfused, and strychnine injected hypodermically, abdominal section was performed, and a dead fœtus was delivered by hysterotomy. Unfortunately, when the abdomen was opened, free blood was found in the peritoneal cavity, and it turned out that the vagina and cervix were lacerated. The soft tissues were bruised and ecchymosed, and a great deal of blood was effused under the pelvic peritoneum. The patient lived forty-one hours. Thus she survived the very serious condition of shock present on admission, and the pulse greatly improved. She died when the effects of laceration and infection of the pelvic tissues began to develop. So far as it goes, this case shows that Cæsarean section is better borne than continued traction, when such a stage of impaction, exhaustion, and tonic contraction has been reached.

THE RELATIONS OF THE INSANITIES TO CRIMINAL RESPONSIBILITY AND CIVIL CAPACITY.

By Sir John Batty Tuke, M.D., F.R.C.P.Ed.; and
Charles R. A. Howden, M.A., *Advocate.*

VIII.

(*Continued from page* 161.)

The chief difficulty that we encounter in fixing the limits of responsibility lies not so much in determining the manner as the degree in which the mind must be affected. There is no possibility of drawing anything like a sharp, well-defined line. The cases in which free action is plainly out of the question pass by imperceptible gradations into cases which can scarcely be discriminated from sane states. Even when we limit the defence of insanity to states of intellectual incapacity, the difficulty of degree is strongly felt. The knowledge that an act is criminal may mean nothing more than a glimmering perception that in some way it is punishable. But the difficulty is more conspicuous, though not really greater, when we have to deal with the relative strength or weakness of the forces which affect action. It is clear enough that no definition is possible in the strict sense of the word; what we require is some sort of form or standard which may indicate, however roughly, the point at which we suppose the ordinary normal free action to terminate. In practice we have to decide very much on presumptions. We have already dwelt on the utter impossibility of bringing the amount of insanity, even in the most favourable circumstances, to anything like an exact standard of measurement. We cannot gauge the precise extent of the mental deficiency or disturbance in each particular case, but must be guided very much by inferences which apply to the whole class to which it belongs. But still it would be desirable, if possible, to find some kind of standard which would indicate the cases which fall under the exception a little more exactly than can be done in abstract terms. In the German Criminal Code, for example, the mental disease which excludes responsibility is defined as "a mental disturbance of the activity of the mind, through which free volition is precluded." But the definition does not assist us very much, because there are comparatively few insane persons to whom we could apply it in its strict literal sense; and, on the other hand, if we depart at all from the literal construction, we are at a loss where to draw the line. On the whole, the natural limit in criminal law, at which we may assume that the free choice of the will has practically ceased to exist, is that at which the sanctions of the law have ceased to exercise any appreciable effect. If a man's mind is affected by disease in such a way that he is wholly unable to attach any weight in deliberation to the penalties of the law, it is clear enough that he is beyond the point at which he can be said to exercise any free choice whatever between committing and abstaining from the legal offence, and that he is fairly out of the category of those to whom the law and its punishment were intended to apply. If, on the other hand, he is accessible to the influence of punishment, we may still regard him as choosing, to some extent at least, like ordinary men, between the motives to the act and its penal consequences, although the morbid mental conditions may very materially alter the nature of his guilt. While, however, we may in this way put the conditions which limit responsibility in a somewhat more concrete form, any such standard can only serve to indicate theoretically the class of cases which ought to be entirely exempted from punishment. We can rarely or never bring any individual case exactly to the test; but must be content with showing that it belongs to a class which, according to our general experience of its members, lies quite outside the limits that we have fixed. In reality, the judgment which ordinarily gives effect to the defence of insanity rests not upon any clear conception of the limits of responsibility, but upon the conviction that the accused differs so much from sane men that the asylum and not the prison is the proper place for him; and in practice we must always expect to find something of this vagueness. We may be able to state in general terms the grounds upon which we are entitled to infer responsibility, but we cannot lay down any rule in terms which are exact enough to apply directly to each particular case. There must always be a certain margin within which we must trust either to presumptions or to opinions upon questions of degree which cannot be expressed in precise language.

The objections which have frequently been urged against any departure from the limits of responsibility which are fixed by the existing law, rest not so much upon theory as upon the supposed danger of weakening the check upon crime by according any greater latitude to the defence of insanity. These objections appear to us to rest chiefly upon misapprehensions of the nature and extent of the dangers to be feared. They have taken two directions. Sometimes it is said that by admitting the defence of insanity in cases in which the accused was capable of knowing the criminal nature of his act, we remove the restraint from other lunatics in those very cases in which it is most necessary. At other times the objection takes the form that if the insanity which avoids responsibility is not confined within narrow and definite limits, it may be used, like the plea of extenuating circumstances, to cover cases to which it ought never to be applied.

So far as the effect of the example of punishment upon the insane is concerned, these objections seem to be founded almost entirely upon misconceptions. Of course, the question could never be raised if we were to limit the entire exemption from punishment to those whom we presumed to be incapable of attaching any weight whatever to the penalty of the law. But even if we were to take a looser and more general mode of defining irresponsibility, we should find that it had no effect upon the insane. As a general statement, it is quite correct to say that no person who is insane in any strict sense of the term is ever affected by the prospect of legal punishment. Men are sometimes led to suppose that this is not the case, from knowing how easily many extreme cases are managed in asylums. But the effect produced in such cases is due to the immediate restraint of discipline and the exercise of personal authority. The greater number of those who are thoroughly insane can be easily subjected to these immediate influences, and it is only in some of the most extreme cases that the patient cannot be coerced by the fear of an immediately impending punishment. But it is out of the question to reason from cases so situated to cases subjected to no other restraint than the ordinary chance of detection and punishment. It is doubtful if it would be possible to discover any case in which an insane man has been encouraged to commit a crime by the prospect of escaping punishment upon the plea of irresponsibility, while it is possible to point to many in which the prospect of punishment formed the motive for the crime. To suppose that such a case as the former is in the least likely, indicates a complete misunderstanding of the nature of insanity. And it must further be remembered that in the cases in which such a motive could be possible at all, there is a check which is quite as potent as the fear of legal punishment. The kind of lunatic who might be capable of considering the prospect of his escape from punishment on the plea of insanity, is equally capable of perceiving that if he does so escape punishment it will be at the cost of confinement for life in an asylum, and to that he has quite as strong an objection. The danger of removing the restraint of punishment from those who are included within any reasonable definition of irresponsibility, is either wholly imaginary or is at the very most so extremely slight as to be negligible.

The practical apprehension, however, which has had most influence in making the Courts adhere to the old strict definition, is not so much the fear that danger might result from lunatics being released from the check of punishment, as that criminals who were not insane at all might escape under some loose definition. They doubted whether the cases, for example, described as moral insanity or homicidal impulse really existed, and they saw that the description given of them could readily be applied to sane criminals. The danger has probably been much exaggerated. The cases in which it would have been possible have generally been singular ones, and have attracted an undue share of public attention. But in any event the danger is not one which should prevent us from fixing responsibility at its proper limits. It certainly ought to make us careful as to the manner of ascertaining the existence of insanity; but when once we are within the morbid limits, there is no reason why every mode in which free action may be affected should not be freely taken into account. We shall never, of course, get entirely rid of the practical difficulties of the question. There must always be a margin of doubtful cases, in some of which we may be quite uncertain whether the mental phenomena ought to be ascribed to the existence of a morbid element, and in others of which we may not feel sure that the effect of the morbid element is enough to avoid responsibilty; but the difficulty is not really greater than that which must necessarily be encountered in dealing with a question of fact which is so subtle and obscure; and it affords no justification for maintaining a definition which certainly includes none except extreme cases of insanity, and as certainly excludes a very large number which ought equally to be regarded as irresponsible.

If we fix the limits of entire irresponsibility at the point at which the power of free choice is so much affected by disease that the ordinary penalty of the law has ceased to exercise any appreciable influence, we shall find that we have included within these limits all those classes of persons who are ordinarily recognised as insane, and who differ so much in their character and mode of action from sane men that they cannot be regarded as justly subject to the operation of the same laws. But outside these limits we find a number of cases in which there is distinctly perceptible a morbid element which affects and determines their acts, but in which, nevertheless, we cannot say that the power of free action is so completely suspended that they are no longer accessible to the ordinary motives and restraints. They are not, as a rule, considered fit subjects for asylum treatment; punishment affects them as a deterrent influence; but they are distinctly subject to unfavourable conditions, and are not so capable of obeying the law as other men are. We cannot say of them that they could not help doing what they did in any other sense than we could say it of other men who are affected by circumstances to which the law pays no regard; but since the cause of their disability is only a minor phase of that which in a higher degree is regarded as a complete excuse, it seems only reasonable to admit it in its lesser degree as a mitigation of punishment.

There is scarcely a single case of this class to be found among those in which mental disease affects a previously healthy subject. In almost all these cases the mental disturbance is either obviously or presumably so great that they fall distinctly within the limits of irresponsibility. Isolated cases may however occur, possibly, for example, in connection with hysteria, in which a criminal act may be really determined by the influence of disease, but in which so much intelligence and self-control still remain that it is difficult to regard the case as one of complete irresponsibility. Such cases, however, stand in a different position from those to which we are about to refer. If there is a sane personality to fall back upon, and the act seems clearly one which has been caused by the incidence of disease, measures of cure and not of punishment are the proper ones to be adopted. If the act is one which has sprung not from the normal nature of the man, but from a change which has been wrought upon him by disease, even the slightest punishment may be a gross injustice. When the sane nature returns, the act itself will be felt as a sufficient misfortune without the additional stigma of a criminal conviction. In the few cases of disease, therefore, in which the question of responsibility is merely a doubtful one, these considerations ought to determine us in favour of entire exemption from punishment.

The question of mitigated punishment becomes one of practical importance in those cases of defect and degeneration, for the most part of a congenital or hereditary nature, which lie on the boundary of insanity. Such cases may possess a varying amount of intelligence or self-control, according to the type to which they belong. Persons so afflicted are competent, as a rule, to transact their affairs and look after their interests, so that there appears to be no necessity for relegating them to an asylum; but they break down under a strain or temptation which would be resisted by ordinary men of the same moral habit.

These cases are at least so far recognised in this country, that weakness of mind is admitted as a proper ground for recommendation to mercy by a jury. That phrase suggests a quite familiar type. It includes the cases which are characterised by a slight weakness of the understanding, or an unusual facility of disposition, which, although insufficient to rank them amongst the insane, separates them clearly enough from ordinary healthy men. They are led into crime by temptations which would not seriously affect other men in similar circumstances, and very often they do not realise the full meaning of the act and its penalty. We cannot wholly exempt such cases from punishment, and they are not fit cases for an asylum. But we feel that the punishment ought to be administered for the purpose of correction, as in applying it to children, rather than with the view of rigorously vindicating the law.

There is, however, another class of cases which, though not generally termed weak-minded, derive their peculiarities, quite as much as the others do, from physical brain-weakness, and which are equally entitled to merciful consideration. In these the morbid taint or defect shows itself (sometimes in combination with intellectual deficiency) in the shape of irritability or excitability. Their crimes are the results of outbursts of passion which they are unable to control, or of ideas that take root in their morbid nature and influence them in a way that is scarcely conceivable from ordinary experience. Cases of this kind are often very difficult to distinguish, on the one hand, from those in which the impulse to action may truly be said to be irresistible, and, on the other, from exceptional instances of an ordinary passionate or excitable temperament. Sometimes, also, the circumstances are complicated by the morbid nervous character appearing in the shape of an exceptional liability to the influence of stimulants. But between the two extremes there are certainly a large number of cases in which the temporary passion or excitement passes the limits of healthy action, and is probably irresistible at the moment, although it may not be wholly out of the reach of control if it is checked or avoided in time. In such cases punishment may be consonant with justice, and may possess a certain correctional effect, while at the same time the circumstances may justify its reduction to a minimum.

In all these cases we assume that the act is not the outcome of tendencies which are essentially or habitually criminal; so that we may suppose that a moderate punishment may be sufficiently effective, and that the ground of mitigation is clear enough to separate the subject from ordinary criminals. There are, however, numerous cases in which no such clear separation is practicable. We find cases in which the morbid element exhibits itself in depravity or criminal habits, scarcely, if at all, distinguishable from the common type, or in which its influence is inextricably mingled with the results of criminal education. Probably a large portion of the habitual criminal class is in some way mentally defective. But in such cases it is practically impossible to take the morbid influence into account. However desirable in theory it might be to do so, in practice no line can be drawn which would separate the responsible from the irresponsible cases. We may with perfect safety admit mental weakness or defect as a ground of mitigation when the crime appears to be an exceptional act; but when it is the result of permanent criminal habits or tendencies, which are partly due to mental defect, but which there is no hope of correcting by any minor punishment, we have at present no other resource but to treat the subject as one of the ordinary criminal class, or, at the most, we may permit the peculiar circumstances to modify his treatment while in prison.

(*To be continued.*)

REVIEWS OF BRITISH AND FOREIGN LITERATURE.

Practical Physiological Chemistry. By J. A. Milroy, M.A., M.D., and T. H. Milroy, M.D., B.Sc., F.R.S.E. Edinburgh and London: William Green & Sons.

This work is a welcome addition to the comparatively small number of text-books on Physiological Chemistry in the English language. It is essentially a hand-book for directing the student in practical work; the authors in their preface state that it is intended to serve as a guide to junior students attending a course of practical physiological chemistry of approximately three months' duration. It covers far more ground than is usually required of junior students, and a mastery of its contents would suffice to give one a very good working knowledge of the subject; it will be found very useful to the senior student as well as the junior. The material is well arranged and clearly stated, and is also very well adapted to the needs of the clinician. The section on the urine is especially good. After dealing with its normal constituents and their detection, the authors take up the consideration of pathological constituents, and finally go very minutely into the quantitative estimations of the various substances found in health and disease; these methods are fully explained, and examples carefully worked out are given as illustrations. More than one method is frequently dealt with, thus in the estimation of uric acid that of Ludwig as modified by Salkowski is taken as the standard process and fully described, but the more usually employed method of Hopkins is given the first place.

The book appears to be a large one when first taken up, but this is more apparent than real, for between each sheet of printed matter is a blank sheet on which notes can be made, and there is a somewhat large number of blank pages at the end. This system of interleaving may not commend itself to all, but is certainly very useful to the student who is systematically working through the book; it makes it less easy to look up as a work of reference. The omission of a number of blank pages especially in the appendix and certain other places where they are not required, would be an improvement.

The text is admirable throughout, and is divided into three sections: qualitative, quantitative, and appendix. The sections are sub-divided into chapters under natural headings, which greatly facilitates reference. No attempt has been made to divide it into daily exercises, and rightly so, for these must vary greatly, and would tend to interfere with the compactness of the work. Theory has been for the most part excluded except where essential for the explanation of the methods employed. All the tests and practical directions bear evidence of having been carefully rehearsed by the authors, and where there is difficulty or uncertainty in the carrying out of any method, it is frankly so stated and explained. In Chapter VII., page 45, it would be better perhaps if the actual colour reactions resulting from the mixture of different solutions with colour reagents were stated; as it is, the student is left to note them himself. The part of the book treating of the spectroscopic examination of the blood pigments is particularly good, and contains many useful points in their preparation which are not to be found in any other work; the spectra charts, too, are well reproduced. Altogether, the book will prove of great service both to the student and the clinician.

A Short Treatise on Anti-Typhoid Inoculation, containing an Exposition of the Principles of the Method and a Summary of the Results achieved by its Application. By A. E. Wright, M.D. Westminster: Archibald Constable & Co. Ltd.

This is an amplification in book form of a series of three papers recently contributed by the author to *The Practitioner.* The general principles of immunisation are first of all briefly discussed, their application to the particular problem of producing immunity to typhoid fever, and the technique and clinical effects of anti-typhoid inoculation are dealt with, and lastly there is a chapter devoted to the practical results of anti-typhoid inoculation as disclosed in the statistical records. An appendix gives a detailed description, with illustrations, of the procedure employed for preparing and standardising anti-typhoid vaccine.

The author regards the faculty of immunisation as a physiological entity, and the machinery of its production as a purely chemical one, but does not enter upon the theories of the explanation of the mechanism. He gives a very lucid account of the principles of immunisation, and of how they have been evolved.

Great stress is laid on the important fact that the success of an inoculation process depends not only upon the selection of an appropriate vaccine, but even more on the knowledge by the operator of the general features of the reaction of immunisation. After inoculation there is always a negative phase, during which the blood is impoverished in anti-tropic substances, and there is an increased susceptibility of the organism to infection. This is followed by a positive phase with high immunity, which diminishes somewhat, but remains permanently increased. A second inoculation, falling on the negative phase of the first, gives rise to cumulation in the direction of the negative phase, and sets up a condition of cumulative susceptibility. To produce cumulation of immunity, the second inoculation should fall on the positive phase of the previous dose.

The author recommends sterilisation at a temperature of 60° C. of a recent culture of typhoid bacilli in 1 per cent. peptone broth as affording the best and safest material. Standardisation is performed by actual enumeration under the microscope, the methods employed being fully treated in the appendix. The dose for inoculation is on the first occasion a quantity of fluid containing 750 to 1000 millions of bacilli, and double that amount for the second. Subcutaneous injection was the method adopted; in a few cases internal administration was tried, but though not without action, proved uncertain.

In his preface the author mentions that his work in connection with anti-typhoid inoculation in the army included the inoculation of 4000 British soldiers in India, and the supply of some 400,000 doses of anti-typhoid vaccine during the South African war, work all given gratuitously. The statistics furnished by these inoculations are carefully gone into, and the numerous sources of error shown; but the author has good ground for believing that they conclusively prove the value of inoculation. In the inoculated the subsequent occurrence of the disease was one-half only of what it was in the uninoculated, and frequently much less; while of those who subsequently developed the disease after inoculation fewer died in the same proportion.

The book is a very valuable contribution to medicine, is clearly written, and easily followed.

Nothnagel's Practice: Diseases of the Stomach. By F. Riegel. Edited, with Additions, by Charles G. Stockton, M.D.

Diseases of the Intestines and Peritoneum. By Professor Dr. Hermann Nothnagel. Edited, with Additions, by H. D. Rolleston, M.D., F.R.C.P. Authorised Translation from the German, under the Editorial Supervision of Alfred Stengel, M.D. Philadelphia and London: W. B. Saunders & Co.

The first of these volumes contains only 825 pages, the second 1032, including in each case the index, giving a total of 1857 pages entirely devoted to diseases of the stomach and bowel, excepting for a couple of hundred pages or so, devoted to peritoneal affections.

The fact that the authorised translation from the German of Professor Nothnagel has been performed under the supervision of Alfred Stengel is a criterion that the work has been well done. Of course, as the work has been published in America, some of the spelling is peculiar in our eyes. This is not the place to enter into a controversy as to the American methods of spelling British words, and although it has probably been objected to before this by other writers, we confess that we cannot understand how a chloride or an oxide should have their terminal e's cut off, thus bringing them into line with the word acid.

The first part, the part relating to the stomach, deals with general diagnosis and treatment. It commences with a very good description of the physical methods of examination, following this up with a very compendious description of the characters of the stomach contents, and the methods of analysing the same. Proceeding, the author deals with the treatment of stomach diseases in general, and we are glad to note that he is not one of those who swear by the use of artificially prepared peptones and albumoses. He undoubtedly ascribes to these preparations a certain value, under certain circumstances, but does not attribute to them the wonderful efficacy which their makers and some physicians are disposed to accord them. With regard to the vexed question of lavage of the stomach, the author takes up a very reasonable position, although we are not quite sure whether the inculcation of a habit, or rather the power, of washing out the stomach, by the ingestion of large quantities of plain water, and its subsequent expulsion without the aid of a stomach-tube, is not better, we quite recognise the force of the author's argument contained in the following paragraph:—

"The stomach is one of the organs whose function is periodic, consequently it needs intervals of rest. This applies to the healthy stomach, and, of course, with greater force to the stomach when it is diseased. One of the best ways to create favourable conditions for the cure of any disease of the stomach is to place the organ at rest for some time. Assuming, even, that we remove valuable nutritive material from the stomach, by performing lavage in the evening, we are not certain whether or not the retention of food injures the diseased organ. We can, at all events, readily compensate any waste of food which may occur—that is simply a question of expense; as a matter of fact, we replace this loss at once by introducing new food into the stomach, after it has been thoroughly cleansed. Under these conditions, the food eaten is more thoroughly utilised than if it is given on top of old and partially fermented food."

The volume connected with diseases of the stomach can be recommended to all practitioners who wish to become conversant with the most modern ideas about that organ and its treatment, the more so that the original text has been added to by the American editor.

Not long ago we had occasion to notice Professor Hemmeter's work upon the diseases of the bowels. The second volume of the monographs, translated from the German under the editorship of Dr. Stengel, seems to be rather superfluous, treating as it does of the same subject, but not nearly so fully.

There is certainly a great difference in the methods employed by the two authorities, in their clerical descriptions of intestinal and peritoneal conditions.

The second portion of "Nothnagel's Practice," as edited by Rolleston, certainly suffers from the great number of editorial additions included in its pages, for in many places they do not run harmoniously with the text. Of course, it is difficult to render into English, German literature; it seems, however, to be even more difficult to translate the Teutonic language into American. It would be hardly worth while to investigate the changes of tense which occur so frequently throughout the volume, and which so aggravate any one reading it who happens to have a sense of tense.

NOTES ON BOOKS.

Gould's *Year-Book*, "Surgery" for 1904 (London: W. B. Saunders & Co.), presents a comprehensive survey of the year's work in surgery. The general arrangement and size of the volume are the same as in the issue for 1903, but the increased number of plates and illustrations in this year's issue make it even more valuable than its predecessors. Many of the novel surgical methods referred to, which would have been difficult to describe intelligibly in an abstract, are rendered clear by good illustrations. We note that, although American work occupies a large part of the *Year-Book*, English, German, French, and Italian writers are well represented, and readers of the *Year-Book* may, we think, feel confident that no work of interest or importance fails to receive notice in this carefully edited survey of current surgical literature.

The ordinary man in the street, who does not think it worth while to read any of the Goverment's official publications, supposing that they are all as dry as dust, would be much surprised to find that some of them are carefully worked-out scientific documents. A case in point is the *Thirty-Second Annual Report of the Local Government Board*, 1902–03, containing as a supplement the report of the medical officer. It is a most voluminous work, containing close upon 700 pages. There are a great number of finely executed maps in it, illustrating areas infected by different epidemics, and a number of excellent micro-photographs of bacteria. In the appendices, various matters, as typhoid fever caused by the eating of oysters, plague borne by rats, and the giving of vaccine to monkeys, as well as numbers of other topics, are included.

The second volume of the *Fourteenth Series of International Clinics* (London: Lippincott & Co.) commences with a very fully and finely illustrated paper upon the "Life History of Mosquitos," written by Charles F. Mason of Texas; a paper follows by Dr. M'Crae upon "Recent Progress in Tropical Medicine," in which he takes up sleeping sickness, malaria, beri-beri. Several other papers follow, dealing with the diseases of warm climates.

The next section comes under the heading of "Treatment," and deals with "Diseases of the Circulatory System." Papers dealing with "General Medicine and Surgery" follow; one upon "Broncho-Pneumonia in Children," and another upon "Nasal Obstruction," finishing up a most interesting volume.

In the *Transactions of the Association of American Physicians*, vol. xviii. 1903, there is an interesting article upon the relief given by the X-rays to certain forms of skin disease, another entitled "Studies in Mammalian Tubercle Bacilli iii.," by Smith of Harvard. It would take too long to mention even a tithe of the other papers.

Professor Barker has translated a short work by Lennander, Professor of Surgery in Upsala, Sweden, entitled *Observations on the Sensibility of the Abdominal Cavity* (London: John Bale, Sons and Danielsson Ltd.). The sum of his conclusions as arrived at may be thus briefly stated. "The parietal peritoneum is extremely sensitive to all operative manipulation. The intestinal tract, on the other hand, the mesenteries, the stomach, the anterior border of the liver, and the gall-bladder, the great omentum, the serous covering of the bladder, as well as the parenchyma of the kidneys, are wholly insensitive to operation even with the thermo-cautery. These organs are insensible to pain or touch. Further, he is led to the conclusion that the parietal peritoneum is only sensitive to pain. A series of abdominal operations are described, performed under various forms of local anæsthesia, illustrating the subject.

Another book upon a kindred subject, the external examination of the digestive system, is termed a *Précis D'Exploration Externe du Tube Digestif*, by Chaillou & MacAuliffe (Paris: Maloine). It takes up the consideration of the digestive apparatus purely from the external standpoint. Illustrated by photographs of the different types of digestive diseases as shown by the abdomen, and full of minute descriptions of all that may be discovered upon external manual exploration, the book is a valuable one which the practitioner and specialist might consult with benefit to himself and his patients.

RECENT ADVANCES IN MEDICAL SCIENCE.

MEDICINE.

UNDER THE CHARGE OF

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Diabetes.

Pathology of Diabetes (Pearce, *Albany Med. Ann.*, 1904, April).—Total extirpation of the pancreas invariably gives glycosuria within a few hours, then acetone, diacetic acid, and oxybutyric acid in the urine, thirst, and emaciation. If one quarter of the organ remains, or if it be transplanted elsewhere in the body, diabetes does not follow. The glycosuria is due to abolition of the internal secretion of the pancreas, and no other organ is able vicariously to assume its function. The nature of the pancreatic lesion in diabetes was for long uncertain, since in many cases no gross changes could be found, while in others there was extreme pancreatic disease without diabetes. Recent work, however, shows that there are two main forms of chronic pancreatitis—the interlobular and the interacinous. The latter is characterised by invasion or degeneration of the islands of Langerhans, and to the involvement of these structures diabetes is due. Pearce records six cases of diabetes, in four of which arterial changes involved the islands, in one degeneration of these structures was present, and in one no pancreatic lesion was found, but fibro-caseous nodules were present in the adrenals. Cancer is most likely to produce diabetes when it involves the head of the pancreas, obstructs the duct, and causes secondary pancreatitis. It is, however, difficult to explain cases of complete destruction of the organ by cancer without the development of diabetes. Of thirty cases of cancer, three were accompanied by glycosuria. In one of these, with true diabetes, the above lesion was found; in another, with intermittent glycosuria, Langerhans' islands were normal; the third case afforded no data for conclusions. In health, alimentary glycosuria follows the administration of more than 250 grms. of sugar; in disease, a smaller quantity causes it, probably from altered function of the islands of Langerhans. It has not, however, been proved that all cases of diabetes have a pancreatic origin, nearly half of those carefully studied showing no changes in this organ. The islands of Langerhans have much similarity to other ductless glands; they become differentiated from the rest of the pancreas at a very early stage in its development. Pearce finds that they offer considerable resistance to invasion and obliteration by neoplasms. After feeding experiments with sugar, they become highly granular from increased functional activity. In acromegalic diabetes, induration of the pancreas, analogous to that in other organs, occurs. In diabetes associated with arterio-sclerosis, probably the vascular degeneration affects the pancreas. In the diabetes of hepatic cirrhosis there is probably coincident pancreatitis—certainly, at least, in *diabete bronzé*. The mechanism of diabetes from bulbar lesion is unknown; phloridzin diabetes is due solely to affection of the renal epithelium. The relation of the thyroid to diabetes (*e.g.* in Graves' disease and after therapeutic use of thyroid extract) is unknown; the pancreas has not been studied in such conditions.

Lancereaux (*Bull. Acad. de méd.*, Paris, 1904, No. 26), in a paper on the nature and lesions of pancreatic diabetes, describes four cases briefly as follows:—(1) Diabetes, infectious tonsillitis and pericarditis; atrophy, interacinous sclerosis, and fatty degeneration of the lobules of the pancreas; almost total disappearance of the islands of Langerhans. (2) Diabetes, phthisis; diffuse interacinous pancreatitis, hyaline degeneration and disappearance of the islands. (3) Pancreatic lithiasis, diabetes, phthisis, coma; atrophy and perilobular pancreatitis, diminution in number and alterations in the islands. (4) Diabetes, coma; diffuse periacinous pancreatitis; disappearance of the islands of Langerhans. In these cases the lobular lesion was variable, but Langerhans' islands were always affected. Diabetes is symptomatic either of the arthritic diathesis, nervous lesion, or pancreatic inadequacy.

In "L'origine du diabète et ses rapports avec les états morbides des glandes vasculaires sanguines," *Ann. Soc. roy. d. sc. méd. et nat. de Brux.*, Paris, 1903, tome xii. fasc. 4, Lorand discusses the subject from a quite different point of view. He has collected, perhaps rather uncritically at times, a huge mass of facts bearing on glycosuria, and though the paper is somewhat theoretical and the web of its argument loosely woven, it is in many ways suggestive, and interesting as typifying the views held in France more than elsewhere, on the important rôle which the thyroid plays in the animal economy. It is impossible to give more than a bare sketch of the paper—(1) *Relation of diabetes to Graves' disease and acromegaly.*—The same series of causes—Jewish birth, heredity, nervous shock or accident, and infectious diseases—is operative in all three. Evidence of exaggerated activity of the thyroid has been demonstrated histologically on many infectious diseases. The three own many symptoms in common—polyuria, emaciation, polydipsia, glycosuria, amenorrhœa, nervousness, and tachycardia. Lorand has specially observed that a slight enlargement of the thyroid is common in diabetes. (2) *Alterations in the ductless glands in diabetes, acromegaly, and Graves' disease.*—In pancreatic diabetes there is degeneration of the islands of Langerhans, which are structurally comparable to the thyroid, pituitary, and suprarenals. In acromegaly, which is due to lesion of the anterior half of the pituitary body, there may be thyroid enlargement and the symptoms of Graves' disease, or, in exceptional cases, thyroid atrophy and myxœdema. In Graves' disease, associated as it is with hyperthyroidism, the thymus is often intact. (3) *Relations between the thyroid and other ductless glands, especially the pancreas.*—Extirpation of the thyroid causes some hypertrophy of the pituitary, and changes in that organ have also been observed in myxœdema and cretinism. Extirpation of the pituitary may cause hyperthyroidism and glycosuria. The tendency to alimentary glycosuria in Graves' disease is probably due to alterations in the islands of Langerhans, plus over-activity of the thyroid. Conversely, Graves' disease has been seen to occur in the course of diabetes. That the thyroid is related to the reproductive organs is shown by its enlargement during pregnancy and menstruation, by the atrophic changes in the reproductive glands in acromegaly and myxœdema, and by the occurrence of amenorrhœa in Graves' disease. In eunuchs and the subjects of ritual castration obesity is common, and a slight increase in the length of the lower limbs similar to that occurring in certain forms of thyroid inadequacy (*myxœdème fruste,* and the Loraine type of infantilism) may take place. Thyroid atrophy has been observed in Addison's disease, and a degeneration of the suprarenals in myxœdema. There appears to be some antagonism between pancreatic activity and that of the suprarenals and thyroid. For this reason glycosuria is rare in myxœdema and Addison's disease (=defective thyroid action plus normal pancreatic action), common in Graves' disease, while Graves' disease occurs in diabetes (=defective pancreatic action plus undue thyroid action). The thyroid enlargement noticed by Lorand in diabetes bears this out. (4) *Glycosuria and hyperthyroidism.*—The conditions in which glycosuria occurs are mostly also associated with hyperthyroidism. In addition to those mentioned above, we have lactation, pregnancy (in which temporary diabetes or temporary Graves' disease may occur), infections of all kinds, in which the thyroid contains excess of colloid, and experimental thyroid feeding. In acromegaly, glycosuria only occurs along with other symptoms of increased activity of the thyroid, never where there are evidences of myxœdema. In conditions of thyroid inactivity—*e.g.* cretinism—glycosuria does not follow the ingestion of even large quantities of thyroid. (5) *Pathogenesis and nature of diabetes.*—Hyperactivity of the thyroid leads to pancreatic degeneration, and *vice versâ.* Alimentary glycosuria is the mildest type of diabetes; it is more or less pronounced, according to the pancreatic lesion. Changes in the pancreas may be caused by arterial disease and obesity, the lesions developing little by little. Diabetes following puncture of the floor of the fourth ventricle is due to nerve influences affecting the thyroid. When glycosuria develops after shock or in Graves' disease, if it is transitory it is due merely to hyperactivity of the thyroid; if permanent, to pancreatic lesion also. Lorand supposes that the internal secretion of the islands of Langerhans neutralises the toxins eliminated by other glands, especially the thyroid. If the pancreas is intact and the thyroid over-active, more toxin is produced than the pancreas can destroy, and temporary or alimentary glycosuria occurs; if the pancreas is degenerated and the thyroid active—*e.g.* in young persons—diabetes of bad type develops; while, if the thyroid is inactive, there is only mild diabetes, as is seen in the obese and aged. (6) *Serum therapeutics of diabetes.*—The object is to produce athyroidism by the use of a serum from an animal deprived of its thyroid. Lorand gives a series of ten cases treated thus with Rodagène (goat serum) and Merck's anti-thyroidine (from the sheep). He certainly appears to have obtained, in most instances, a very striking diminution, and in a few entire disappearance, of sugar from the urine. Mann (*Berl. klin. Wchnschr.*, 1904, July 25) records an interesting case of transitory diabetes in a man suffering from gastric cancer. The first symptoms were polydipsia and polyuria (4 litres daily), which lasted for twelve days without glycosuria. Then 100 grms. of grape sugar was administered to test the patient's assimilative capacity, with the result that 121 grms. of dextrose were extracted during the ensuing twenty-four hours. The glycosuria increased steadily on an ordinary diet, and in a week acetone appeared in the urine. Diabetic diet was then enforced, and the sugar and acetone disappeared in eleven days. Some weeks thereafter the patient died from hæmatemesis, and on post-mortem examination was found to have a carcinoma of the stomach invading the pancreas. The gland itself was to all appearance normal macroscopically; the liver and brain showed no secondary deposits. The remarkable facts in the case were, first, the transformation of diabetes insipidus into diabetes mellitus; and, second, the temporary nature of a glycosuria so severe that acidosis developed within a few days. The value of the case is greatly diminished by the fact that no microscopic examination of the pancreas was made; the writer, however (though on grounds which do not seem adequate), rejects the idea that the case was one of diabetes due to implication of the pancreas by the new growth.

PHYSIOLOGICAL CHEMISTRY OF DIABETES (Edsall, *Albany Med. Ann.*, 1904, April).—Lépine's original theory (the pancreas furnishes normal blood with a glycolytic ferment, deficiency in which causes diabetes) having been disproved, he suggests that the pancreas merely regulates the action of such a ferment supplied by the other tissues; the pancreas also destroys substances normally present which interfere with sugar metabolism. There is, however, great practical difficulty in preventing the vitiation by bacterial action of experiments on glycolysis, such as those on which the hypothesis is founded, and when this source of error is excluded it seems that no sugar destruction is produced by pancreatic and other tissue juices alone. The theory of a glycolytic ferment in the blood therefore remains doubtful. Recent work has taken a new course, and has shown that while pancreas juice and muscle juice separately have no sugar-destroying power, they have, if mixed, a very decided glycolytic action. This may be due either to an "activation" of the one body by the other, or by the two standing in the relationship of complement and immune body—in either case failing when the pancreatic function is in abeyance. There is, however, a good deal of difficulty in unreservedly accepting the view that diabetes is due to imperfect glycolysis alone. Apart from the experimental work bearing on this, it is well known clinically that different patients assimilate different carbohydrates with varying degrees of facility—*e.g.*, they may bear lævulose well, or even potatoes and oatmeal. This is a strong argument against diabetes being simply a deficient oxidation of sugar, though it may be that the organism produces a number of ferments for sugar, and that the varying responses to different carbohydrates are due to abnormalities in a few of those ferments only. The possibility that the difficulty in diabetes is largely one of glycogen construction or of exceedingly rapid conversion of glycogen into sugar, must be taken into account. The really important facts proven so far are, that the pancreas influences carbohydrate metabolism, probably not simply by providing a glycolytic ferment, but by influencing the glycolytic activity of other tissues; and, secondly, that carbohydrate metabolism is probably as complex as that of proteids.

SURGERY.

UNDER THE CHARGE OF

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DEDUCTIONS FROM AN EXPERIENCE OF TWO THOUSAND CASES OF APPENDICITIS.

On the 2nd of March 1889, Murphy of Chicago performed his first operation for appendicitis, and on the 22nd of July 1903 he performed his two thousandth. In the paper before us (*Am. Journ. Med. Sc.*, Phila., 1904, August) he gives the deductions he has drawn from this experience, and these should be read by everyone interested in the subject. It is impossible to make an abstract of such a paper, which will do justice to the author. We can only cull a few of the more notable statements, and refer our readers to the original article. In a brief historical note the author recalls "how reluctantly the advocate of the soothing death-lullaby of the opium treatment vacated his position," and remarks that the "nine-lived procrastinator has not yet capitulated." The importance in diagnosis of a rectal and vaginal examination is duly emphasised; in about 5 per cent. of his cases the appendix was found in the pelvis, and in a large proportion of these the abscess was entirely confined to the pelvis. The comparative frequency with which the appendix passes into a right-sided hernial sac leads the author to say that "the presence of acute infective appendicitis should be suspected in all right-sided hernias, where there is rapid elevation of temperature, with nausea and vomiting, shortly after the manifestation of strangulation, as simple intestinal strangulation in a hernial sac never gives a primary elevation of temperature." Foreign bodies, such as fruit seeds, gall-stones, etc., were present in a little less than 2 per cent. of the cases, while fæcal concretions were found in 38 per cent. The author lays great stress on the importance of noting the order in which the symptoms appear in the diagnosis of appendicitis, namely, pain, nausea and vomiting, local sensitiveness, and elevation of temperature. He says, "when that order varies I always question the diagnosis. If the nausea and vomiting, or temperature, precede the pain, I feel certain that the case is not one of appendicitis. In not a single case was pain absent as an initial symptom." The primary nausea and vomiting is reflex; there is only one or two efforts at emesis, and the nausea then passes away. The secondary nausea and often persistent vomiting is due to infection of the peritoneum. Temperature was not absent in a single acute infective case in its *early stage*, *i.e.* in the first thirty-six hours after the onset of symptoms. "I would not operate on a case where I was confident that no temperature had been present in the first thirty-six hours of the disease." "The temperature may all subside within twenty-four hours after the onset, and if it subsides suddenly I am fearful that the cause of its subsidence is a gangrene of the mucosa." Secondary elevation of temperature is an indication for immediate operation.

With regard to the value of leucocytosis in the diagnosis of appendicitis, the author says that "the more extended our experience, the less valuable it became." In the very early hours of appendicitis the impression of a tumour is due to spasmodic contraction of the muscle fibres directly over the situation of the appendix. "So frequent is this deception, that I feel it should be constantly borne in mind."

With regard to the question of the time for operative interference, the author says that "the most favourable time for operation is within the first forty-eight hours of the attack, or, from a pathological basis, before the perforation of the appendix or the infection of the peri-appendical tissue. The diagnosis can and should be made with accuracy in the great majority of cases before the end of the first twenty-four hours, and almost universally within the first forty-eight hours." It is impossible to predict with any degree of certainty what the subsequent course of the disease will be: whether to subsidence and cure, or to a virulent, if not fatal, conclusion. "Procrastination, under these circumstances, I do not interpret as a manifestation of knowledge, experience, judgment, or true conservatism, but a stigma of their opposite." The appendix was removed in nine cases out of ten operated on in the second stage. In the last two and a half years' work in general septic peritonitis, the author has lost but one case following the operation. During the after-treatment the patient is kept in a semi-sitting position, 35 to 45 degrees, for three or four days. Large quantities (4 to 12 quarts in twenty-four hours) of saline solution are administered by the rectum. No water is given by the mouth, but when alcoholic stimulants are required, these are given by mouth.

The author prefers an incision made along the outer margin of the rectus, and rarely goes through the transverse muscles, or makes the M'Arthur or M'Burney incision. In cases of acute and virulent infection, a ligature is placed on the mesentery, and one on the appendix, and both are amputated short, no effort being made to embed the stump of the appendix. He has not had a single case of fæcal fistula requiring an operation for its closure. All acute cases are drained. Irrigation is never resorted to.

ON HÆMATURIA FOLLOWING CATHETERISATION IN ACUTE RETENTION.

CONSIDERABLE difference of opinion exists as to the cause of the hæmorrhage which occasionally ensues after rapidly emptying, by means of the catheter, a bladder which has been the seat of acute retention of urine, Grelinski (*Ann. d. mal. d. org. genito-urin.*, Paris, 1904, *September* 1), from a careful study of the clinical facts and pathological conditions of the urinary organs in three cases, comes to the conclusion that it cannot be affirmed that the congestion of the urinary mucous membranes, which is associated with complete retention, sufficiently accounts for the majority of these hæmorrhages. If the congestion alone were the cause, the bleeding would be much more common than it is, particularly in view of the fact that the bladder is often rapidly emptied, the flow in many cases being accelerated by pressure applied through the abdominal wall. The author believes that the hæmaturia is usually due to gross lesions of long standing. He has not found any proof of the existence of so-called "primary hæmaturia," having for its only cause the simple congestion of the bladder walls. In none of his cases did he find those effusions of blood into the muscular coats and external connective tissue planes which have been met with in experimental cases.

SOME MODIFICATIONS IN THE TECHNIQUE OF THIERSCH'S SKIN-GRAFTING.

WHILE granting the superiority of Thiersch's method of skin-grafting over other procedures, Lauenstein (*Centralbl. f. Chir.*, Leipzig, 1904, September 3) suggests that the technique might be improved in some points. In his experience, for example, grafts taken from other sources than the patient's own body (hetero-plastic grafts) have not been so uniformly successful as auto-plastic grafts. He expresses some doubt also as to the wisdom of scraping with the sharp spoon a granulating surface on which it is proposed to apply grafts. In many cases, after the removal of the granulations in this way, a cicatricial, fibrous ground is left, which is comparatively deficient in vascularity. In a number of cases he has been content with rubbing the granulating surface over with a sterile gauze swab, so as merely to remove the tops of the granulations, and on the fresh surface thus formed he has placed the grafts. The results in his own hands, and also in those of his assistants, have been satisfactory. [From our own experience we can confirm this observation, and can recommend the practice, unless in cases where, for the purpose of rendering the surface aseptic, the sharp spoon is necessary.—ABSTRACTOR.] The dressing recommended by the author is Crede's perforated silver-foil, covered with sterilised gauze. This is left in position for about a week.

REPAIR OF THE URETHRA BY TRANSPLANTATION OF THE URETHRA OF ANIMALS.

HOGARTH PRINGLE of Glasgow (*Ann. Surg.*, Phila., 1904, September) reports the results of three cases in which he has employed the urethra of the bullock to repair defects in the human urethra. Two of his patients were men who had sustained a complete and extensive rupture of the urethra in the perineum, and the third was a boy, æt. 14, with hypospadias, involving the whole of the floor of the penile portion of the urethra. The procedure consists in rawing the tissues of the gap in the urethra, freeing the edges of the normal mucous membrane at each end, and inserting a tube of mucous membrane from the urethra of a recently killed bullock, and stitching it to the freed edges of the urethral mucous membrane. In two of Pringle's cases the grafting had to be repeated, but in the end the results were satisfactory. In the third—a case of traumatic destruction of the urethra—the patient died of suppuration in the kidney, but the grafts had united. The grafts varied in length from 5 to 13 cms.

OBSTETRICS AND GYNÆCOLOGY.

UNDER THE CHARGE OF

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Perpetual Gangrene of the Extremities.

Wormser (*Wien. klin. Rundschau,* 1904, No. 5) has collected eighty cases in childbed, and divides them into three groups—(1) Commencing during pregnancy, seven cases; (2) during childbed, sixty-six cases; (3) Raynaud's disease, seven cases. Of the puerperal cases, in fifty-eight the lower extremities only were affected; in the remaining eight, various parts of the body. The cause of those cases is always infection, followed by obliteration of arteries and veins, endocarditis being an important factor. The prognosis is unfavourable. One-half the patients die, including cases not operated on.

Interstitial Pregnancy.

Weinbreuner (*Ztschr. f. Geburtsh. u. Gynäk.*, Stuttgart, Bd. iii. Heft 1) has collected thirty-five cases of interstitial pregnancy, and adds two from Thorn's practice. Those latter were genuine cases, as in both the gestation sac was excised from the fundus, and the wound stitched with catgut. In one case the ovum had developed for two months in the interstitial part of the tube, and had separated the surrounding muscular fibres. The tumour formed by the ovum passed into the normal fundus of the slightly enlarged uterus. The tube and ovary projected from the apex of the tumour. In the other case the gestation sac developed entirely in the uterine muscular tissue, neither of the tubes showing any change. The sac, containing a macerated 4-months' fœtus, formed a fluctuating tumour on the upper and posterior wall of the left uterine horn. The first case was regarded as one of tubo-interstitial gestation, the other was an example of interstitial gestation proper.

THE ACTION OF CAUSTICS ON THE ENDOMETRIUM.

RIELANDER (*Ztschr. f. Geburtsh. u. Gynäk.*, Stuttgart, Bd. iii. Heft 3), from experimental work, concludes that an alcoholic solution is to be preferred to a watery one in preparing caustics for uterine application. He believes that the caustic thereby penetrates the tissues more deeply, and that the whole uterine mucosa is more uniformly acted upon. Further, the penetration of a watery solution into the mucosa is a gradual one, as compared with the more rapid action of the alcoholic solution. He recommends a 30 per cent. alcoholic solution of formalin applied on a Playfair's probe in endometritis.

THE BLOOD IN PREGNANCY.

PAYER (*Arch. f. Gynäk.*, Berlin, Bd. lxxi.) finds that the blood of pregnant women is normal as regards red corpuscles and hæmoglobin, but is slightly deficient in alkalinity. There is a slight degree of leucocytosis, which may be connected with the deficient alkalescence.

THE ETIOLOGY OF KRAUROSIS VULVÆ.

JUNG (*Ztschr. f. Geburtsh. u. Gynäk.*, Stuttgart, Bd. lii. Heft 1) has examined sections of skin from the vulvæ of patients who had no symptoms pointing to vulvar disease. He found changes which had hitherto been regarded as characteristic of kraurosis, viz. disappearance of the papillæ, small-celled infiltration of the deeper layers of the connective tissue of the corium, and atrophy of the rete Malpighii and the stratum corneum. He concludes that the difference between well-marked kraurosis and a chronic vulvitis is only one of degree, and that it is to be regarded as a final stage of chronic vulvitis and not a distinct clinical condition.

ECLAMPSIA.

MEYER (*Arch. f. Gynäk.*, Berlin, Bd. lxxi.) reports on 117 cases treated at the Zurich Maternity during the past eighteen years. The mortality was thirty-two = 27·7 per cent. for the mothers, and 38 per cent. for the children. Eclampsia occurred once in 117 labours. In thirty-eight cases the fits commenced after the patient was admitted to hospital, and in eight of those cases the urine was free from albumin. In thirty-five cases where a post-mortem examination was made, there were only eight in which previous kidney trouble could be excluded. With regard to treatment, great importance is put on prophylaxis, and after the onset of fits active measures recommended, Bossi's method receiving more favour than cervical incisions and vaginal section.

ECTOPIC GESTATION WITH RETENTION OF A DEAD FŒTUS BEYOND TERM.

SCHMIDT (*Centralbl. f. Gynäk.*, Berlin, 1904, No. 11) reports two cases from Winckel's klinik. (1) P., æt. 40, showing no symptoms suggestive of pregnancy, was operated on for a supposed fibroid of the uterus. The condition proved to be the sac of an ectopic gestation. (2) P., æt. 37; diagnosis of ectopic pregnancy made before operation. The sac was so adherent to the intestines that it was not removed, but drained through the abdominal wound and vagina. Both children were beyond full term, compressed, and showed a condition of varus in the lower extremities. The sac wall contained much hypertrophied muscular tissue, pointing to the pregnancies having developed in the tubes.

OVARIAN DERMOID PERFORATING THE BLADDER.

MUENCH (*Centralbl. f. Gynäk.*, Berlin, 1904, No. 7) reports the following case:—P., æt. 51, was admitted to hospital moribund. She had suffered from urinary troubles for a year. At the post-mortem there was found mitral stenosis, with pulmonary embolism. A dermoid tumour of the left ovary as large as a hen's egg, with papillomatous outgrowths, had perforated the bladder wall. The outgrowth had the form of a raspberry, and had broken through the posterior wall slightly to the left of the middle line.

THERAPEUTICS.

UNDER THE CHARGE OF

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BORIC ACID AND BORAX AS FOOD PRESERVATIVES.

OF the various chemical preservatives of food the two most commonly employed are borax and boric acid. The use of these substances is so general, that persons of all ages must be receiving frequently, if not daily, considerable doses of them in their food. They are added to butter, milk, oleo-margarine, and some forms of cheese. They are applied to fresh meat and fish, while they are important constituents of the brine in which meat is salted and pickled. In curing hams, solutions are injected, and the powder is dusted over the surface. They are found in every known variety of sausage. The advantage over salt is that they do not withdraw water, hence there is less chance of the meat becoming stringy. The natural colour of the flesh is preserved. As regards the percentages found in various articles, the following may be quoted: In canned sausage as much as 0·87 per cent. of boric acid has been discovered. American corned meat has contained 3·87 per cent., and ham yielded from 4·05 per cent. to 2·73 in the innermost parts. Of fifty-one specimens of American preserved meats, every one contained borax, and in the majority, to the extent of 1 per cent. and upwards. In milk, the addition of 0·2–0·1 per cent. of a mixture of borax and boric acid is advocated, equivalent to 30–15 grs. per quart. Butter requires 35 grs. to the pound. Considering how universal is the employment of these substances as preservatives, it is of the greatest importance to be certain that their continued use is not injurious to the health. Most of the observations made for this object are of little value. They consist of feeding experiments lasting only a few days. Others, again, found their objection to the use of borax compounds on isolated instances, where the medicinal use of borax caused unpleasant symptoms. In many instances this may merely have been the expression of a special idiosyncrasy towards borax. It has been repeatedly observed that the medicinal use of borax has produced or aggravated kidney lesions. To find out whether any such influence may be exerted by a diet containing borax preservatives, Harrington performed feeding experiments on twelve healthy cats. The experiment lasted nineteen weeks. All the cats received the same food. One, as a control, received no preservative. Six had boric acid added to their food, and the remaining five received another preservative which proved innocuous. The amount of borax administered varied from 0·54 grm. to 0·85 grm. daily. Three of the borax group showed signs of illness. One sickened very soon, and died at the end of the sixth week. The other two were sick occasionally, but during the last weeks of the experiment appeared to be normally active. All the cats except the one that died gained in weight, ranging from 230 to 990 grms. At the end of the experiment the animals were killed, and their organs were examined microscopically. The control showed no lesions. One cat had slight cirrhosis of the liver. The other five borax cats all showed kidney lesions of the same general character. They consist first in degeneration of the epithelium in all the tubules, but most marked in the convoluted tubes. The normal fat vacuolation is very greatly increased, and in addition there is swelling, and in places disintegration of epithelial cells, with fragmentation of nuclei. In the lumen of many of the collecting tubules are found round and irregular masses representing cell fragments coming from higher up. Tubules also were found almost completely stripped of epithelium. In one of the kidneys there was degeneration of an intense character, with hyaline casts in the small tubules. In other cases the degeneration is not so intense, but is accompanied by areas of cellular infiltration, chiefly at the cortex and round single glomeruli. When the infiltration is most intense the tubules are almost entirely destroyed. These lesions are analogous to those found in subacute and chronic nephritis in man, although they do not conform to any definite type. As regards the somewhat large doses, Harrington shows that a man may easily swallow without knowing it very much larger doses in a day, or even at a single meal. Take milk, with 2 grms. per quart; butter 2 grms. per pound; oysters 4·5 grms. per pint; corned beef 18 grms. per pound; ham 18 grms. per pound; sausages 4 grms. per pound. An oyster stew made with a pint of such milk, and a quarter of a pint of such oysters, followed by a quarter of a pound of ham or corned beef, not a very hearty meal for an average man, would contain 7 grms. of borax and boric acid, and this amount might easily be doubled in the course of the day.—*Am. Journ. Med. Sc.*, Phila., 1904, September.

STRYCHNINE IN COLLAPSE AND SHOCK.

CRILE gives a summary of his research in the action of strychnine on the circulation in these conditions. In the normal animal, when sufficient strychnine is given to cause distinct increase of reflexes and heightened muscular tone, a rise of blood-pressure was noted. In smaller doses, as forty-eight careful experiments showed, no noteworthy changes occurred, though occasionally slight changes appeared, shown either by a slight rise or fall, or by a later irregularity. The stage of increased excitability above mentioned represented the borderland between dosage without effect and that of maximum effect. If after reaching this stage more strychnine was given, convulsions were caused, and the blood-pressure rose abruptly to a very great height, sometimes even more than double the normal. During the convulsion the tracing was irregular, and continued for some time above the normal. The simultaneous appearance of rise in blood-pressure, with increase in the reflex activity, was seen either in cases where a single large dose was given or where numerous very small doses were given at repeated intervals. In a series of experiments where curare was given to prevent the convulsion, the enormous rise in pressure occurred to as great an extent as in the convulsed animals. In another series of experiments the vagi and accelerator nerves were cut and the animal curarised. The general effect on the blood-pressure did not differ from that of corresponding doses on the intact, uncurarised animal. In the curarised animal, and in animals after section of the nerves, the rise following physiological doses lasted from half an hour to an hour and a half. Repetition of the same dose caused a second rise, lasting only about half as long. A third dose usually gave a smaller rise, lasting only a few minutes. And after repeated dosage a stage was soon reached in which no rise results at all, and the pressure remains permanently at a lower level than at the commencement of the operation. So long as a rise followed a dose, the animal reacted to pain and stimulation of the sciatic nerves in the same way as in the normal animal. When the physiological dose no longer produced a rise, then likewise burning the paw or stimulating the sciatic nerve also failed to induce a rise. Small doses seemed to stimulate the respiration; larger doses were frequently followed by respiratory failure. After the final irresponsive stage had been reached, saline infusion caused a slight rise, but on stopping the infusion the pressure fell to the previous level. Digitalis mostly caused no rise, but adrenalin, proportionate to the dose employed, still caused a marked rise.

In animals in which varying degrees of shock had been induced, strychnine caused a rise proportionate to the amount of shock induced. In slight shock the rise and its continuation was but slight. On repeating the dose if the shock was deep, frequently no rise occurred. If the shock was moderate, some rise might occur. In cases where the shock was almost to the fatal degree, only a slight rise occurred, and lasted only a few minutes, after which no amount of strychnine produced a rise. In any degree of shock less than fatal, after the administration of a therapeutic dose of strychnine the animal passed into a deeper degree of shock. In another series of experiments, the animals were bled till the blood-pressure had been reduced to the level of the final breakdown from excessive doses of strychnine. In this condition the administration of therapeutic doses of strychnine caused a marked rise. If the medulla was cocainised, strychnine caused convulsions, but only a slight rise in blood-pressure occurring during the convulsion. Further, if both the medulla and cord were cocainised, no convulsion was produced, and there was no rise in pressure from strychnine, though adrenalin caused a rise proportionate to the dose—a rise that might be as high as double the normal.—*N. Y. Med. Journ.*, 1904, September 24.

[Though Dr. Crile does not draw any conclusion from his experiments, it seems probable that strychnine acts on the circulation through the vasomotor centre in the medulla. As long as the centre is intact and unexhausted, strychnine causes a distinct rise in blood-pressure. If from severe shock or artificial means, cocainising, the action of the centres is eliminated, strychnine no longer causes a rise, though adrenalin, which acts locally on the vessel walls, here still causes a profound rise. In a condition such as hæmorrhage, where the low pressure is not associated with exhaustion of the centre, strychnine causes a marked rise. Repeated doses of strychnine exhaust the centre, and thus in the end strychnine may cause no rise.—F. J. C.]

URANIUM SALTS.

TYLECOTE has investigated the action of uranium salts. They act feebly as antiseptics, but are moderately good astringents and hæmostatics, and can be used as such in chronic gonorrhœa and foul ulcers of the legs. The best salt to employ is the nitrate. In three cases of diabetes he was unable to detect any influence on the sugar secretion, but occasionally the polyuria was diminished and the patients all put on flesh. This increase continued if the dose was not pushed too far, and was accompanied by a feeling of improved condition and better spirits. A similar gain in flesh occurred with three cases of phthisis. Uranium nitrate should be given with care. At first a small dose of 1 gr. may be given, well diluted, thrice daily immediately after meals. If albuminuria develops, it should be suspended for a time, but with care up to 5 grs. may be given, t.i.d. That the drug has been pushed too far is shown by the development or increase of albuminuria; increased output of sugar, intensification of neuralgic pains, and by the weight no longer increasing but commencing to fall.—*Med. Chron.*, Manchester, 1904, September.

STATUS EPILEPTICUS.

TREMAINE recommends moderate venesection to the extent of 8–10 oz., with subsequent infusion of a pint to a pint and a half of saline solution. More saline may be given by hypodermoclysis and rectal injection. This treatment should be combined with active sedative measures in the shape of chloral and bromide by the rectum. He reports two illustrative severe cases in which this line of treatment proved very successful.—*N.Y. Med. Journ.*, 1904, September 10.

PATHOLOGY AND BACTERIOLOGY.

UNDER THE CHARGE OF

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PATHOLOGICAL ANATOMY OF PARATYPHOID FEVER.

PARATYPHOID FEVER is the name given to a set of cases which, clinically, have presented typhoid-like characters, but whose causal organism is thought to be a different organism or organisms, intermediate between the typhoid and colon bacillus. Fatal cases have been rare. Only five have been published up to the present time, the last by Wills and Scott (*Journ. Infect. Dis.*, Chicago, 1904, January 2), who summarise the changes found post-mortem in them all. Splenic enlargement is the most constant feature. It resembles that of typhoid fever both macroscopically and microscopically. Intestinal lesions are variable. Ulcers were present in three out of the five cases, and are probably present only in severe cases. They do not affect the Peyer's patches on solitary glands, and otherwise their characters are non-specific — more like those of dysentery than of typhoid. They do not show the changes of proliferation and phagocytosis seen in the ulcers of typhoid. The mesenteric glands remain practically unaltered. The liver may show focal necrosis differing from those of typhoid in not containing endothelial cells. There seem to be no other changes of any significance. It is interesting to note that the clinical history agrees with the slight character of the intestinal lesions, diarrhœa being present in only 18 per cent., and hæmorrhage in 5 per cent. of the recorded cases. The causal organism seems to be capable of considerable variation. Buxton suggested the following classification:—(1) *Paracolon bacilli.*—Those which do not cause typhoidal symptoms in man, a group containing many different members, but culturally alike (2) *Paratyphoid bacilli.*—Those which cause typhoidal symptoms. They are subdivided into two groups—(a) a distinct species culturally unlike the paracolons; (β) a distinct species culturally resembling the paracolons. It is well to restrict the term paratyphoid fever to those cases which present a clinical resemblance to typhoid fever, grouping other cases as paracolon infections. Agglutination experiments have been carried out by several observers, and lately by Stober in the May number of the same journal. Hard-and-fast lines cannot yet be drawn between the typhoid, paratyphoid, and other intermediate groups. Cultivations of the causal bacilli, as well as agglutination tests, should be made wherever possible. Owing to the difficulty of carrying out the former, the latter are relied upon as being presumably accurate. Ordinarily the paratyphoid organisms require from ten to thirty times more serum for their agglutination than do typhoid bacilli, and if reactions of the suspected serum with these occur in relatively high dilutions, the saturation test is necessary to decide which is the organism producing the infection. If repeated agglutination tests made at intervals in a suspected case prove negative with both typhoid and paratyphoid bacilli, it either denotes infection with some other organism, or possibly may be analogous to the reported cases in which typhoid bacilli were isolated from the blood or stools, and no agglutination of other typhoid bacilli occurred with the patient's serum. In suspected cases of paratyphoid fever, agglutination of members of both groups should be tried, as serum immune to members of one may not agglutinate members of the other group. It is best to use, where possible, bacilli which are known to agglutinate only with serum immune to members of their own group.

THE INFLUENCE OF ALCOHOL, ETHER, AND CHLOROFORM ON NATURAL IMMUNITY IN ITS RELATION TO LEUCOCYTOSIS AND PHAGOCYTOSIS.

RUBIN (*Journ. Infect. Dis.*, Chicago, 1904, May 30) finds that alcohol, ether, and chloroform have a decidedly detrimental action on the natural defences against infection. This action is apparently exerted directly upon the substance or substances which inhibit the growth and toxic action of bacteria in the normal animal, and these substances are either the leucocytes themselves or something derived from them, or both. The period of detrimental action of the narcotic depends largely on the amount administered, the depth of narcosis, and the rapidity of its elimination from the system.

THE PRESENCE OF A SUBSTANCE INHIBITING THE COAGULATION OF THE BLOOD IN ANKYLOSTOMA.

LOEB and Smith (*Proc. Path. Soc.*, Phila., 1904, June) tested the ankylostomata found in dogs for a substance inhibiting the coagulation of the blood. In one dog they found 135 worms, in another 100, in another eighty-five, and in a fourth twenty-seven. They found that the anterior half of the ankylostomum (probably the head or œsophageal glands) possesses a substance markedly inhibiting the coagulation of the blood, which, in a similar way to leech extract, acts in vitro. It is not entirely destroyed by boiling. A hæmolytic action of the extract of ankylostomum cannot be demonstrated, and it is therefore unlikely that these parasites cause anæmia by the direct production of a hæmolytic toxin. The substance inhibiting the coagulation of the blood is probably a factor contributing to the anæmia which is so frequently the result of an ankylostomum infection.

THE SOLUBILITY OF THE TOXIN OF THE TYPHOID BACILLUS.

RODET, Lagriffoul, and Wahby (*Arch. de méd. expér. et d'anat. path.*, Paris, 1904, July) controvert the statement that the toxic products of the typhoid bacillus are entirely intracellular. They allow that filtrates of cultures are little toxic, but assert that the bodies of the bacilli under similar circumstances are even less so. The chief toxin or filtered cultures is not a product of the disintegrated bodies of dead bacilli, but a true secretion into the medium of living ones. A great part of it seems, however, to rest adherent to the bodies of the bacilli. This toxin is insoluble in alcohol, unacted upon by moderate heat, but is so unstable that it appears to become altered almost as soon as it is excreted. They believe that it is responsible for the hurtful action upon the body—in short, the general toxic phenomena of typhoid fever.

THE RÔLE OF THE BLOOD PLATES IN COAGULATION OF THE BLOOD.

BÜRKER (*Arch. f. d. ges. Physiol.*, Bonn, 1904, Bd. cii.) has studied the blood plates under a variety of circumstances. He is convinced that they are natural constituents of the circulating blood. He does not agree with Eberth and Schimmelbusch, but with Bizzozero, that the quantity of fibrin is in proportion to the number of the blood plates. The same influences which preserve or destroy the blood plates hinder or permit coagulation. Chemical substances, for instance, show this. Metaphosphate of soda prevents coagulation. It preserves the blood plates, though it destroys the red cells. The biphosphate of potassium preserves them, and it is seen that the preservation or destruction of the red cells has no influence upon coagulation. Every substance which lessens or hinders coagulation of the blood lessens or hinders destruction of the plates. He goes so far as to think that the fibrin is entirely formed by a transformation of the plates, and that the quantity of the former depends upon the quantity of the latter.

LESIONS PRODUCED BY THE TETANUS TOXIN IN THE NERVES AND THE NERVE TERMINATIONS.

ODIER (*Arch. de méd. expér. et d'anat. path.*, Paris, 1904, tome xvi. p. 451) shows that the poison travels along the motor nerves to the nerve terminations. The peripheral end of the sciatic nerve of a guinea-pig inoculated in the foot will, twenty-four hours after, cause tetanus in a mouse if inserted under the skin; but four days afterwards, if tetanus has supervened, it will not do so. The first parts attacked are always the peripheral nerve terminations. A degeneration and then complete disappearance of the intramuscular nerve termination appears. The toxin acts as a veritable solvent for the nerve endings. He also concludes that the axis cylinders of the nerves, having served as the path of conduction of the toxin, are the seat of a degeneration proportional to the dose and concentration of the poison.

FAMILY DIABETES.

MARTINET (*Presse méd.*, Paris, 1904, February 10, p. 94) found in one family diabetes occurring in the husband, his wife, and his mother. Further, his father had died of the disease. He observed four cases of conjugal diabetes in 1903, and does not believe that it is rare. He lays down the axiom that if one discovers diabetes in one or several members of a family, the urine of all the other members should be examined for sugar, especially if the various members live together.

LABORATORY METHODS.

A simple method of spore staining.—THESING (*Arch. f. Hyg.*, München u. Leipzig, 1904, Bd. l. S. 254–267) allows the film to dry in the air, passes it two or three times through the flame, covers the film with 1 per cent. chloride of platinum, and heats over a Bunsen, washes in water, dries, pours in plenty of the particular stain, *e.g.* carbol fuchsin on Löffler's blue, and heats until the steam rises, pours off the stain, and washes in 33 per cent. alcohol, and dries. A counter stain may now be used (Löffler, if fuchsin has been first used; safranin, vesuvin, or fuchsin if Löffler has been used). The stain is allowed to act for three minutes in the cold, or a few seconds with heat. Wash in water, dry and mount. This method avoids the use of an acid, and gives good results with the spores of anthrax, the potato bacillus, the tetanus bacillus, etc.

Bonhoff, in the same place, pp. 217–222, describes a method for differential staining of typhoid bacilli in sections. Two solutions, each of 1 per cent., are made in warm water, the one of eosin the other methylene-blue. Six drops of the eosin solution are first taken, then 5 c.c. of distilled water added thereto, and then six to twelve drops of the blue solution. The section is stained in this mixture for half an hour, then differentiated in acetic acid and alcohol clarified in xylol or aniline xylol. The connective tissue and the protoplasm of the cells are coloured red, the bacilli and the nuclei of the cells blue. The author further experimented with Pick-Jacobson's method for differentiating the gonococcus from the nuclei of pus, and succeeded well by the following modification. He washes the section in alcohol, and agitates it for two minutes in the following hot solution: four drops of a saturated alcoholic solution of methylene-blue, fifteen drops of Ziehl's solution, and 20 c.c.

of distilled water; pour off the stain and wash in water, add 1 per cent. eosin, wash in water, allow to dry. The cocci or typhoid bacilli are sky blue, the tissues are red.

DISEASES OF THE EAR, NOSE, AND THROAT.

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Lingual Goitre.

A very interesting paper upon this somewhat rare condition comes from the pen of Henry R. Storrs (*Ann. Surg.*, Phila., 1904, September). By this term is meant a tumour consisting of normal or pathological thyroid tissue arising from one of the accessory thyroid glands, which may occur at the base of the tongue in the course of the development of the thyro-glossal duct. The author has briefly summarised all the cases which have been reported in literature, and, along with three additional ones, he brings the total number to thirty-two. It is interesting to observe, from an analysis of these cases, that only three occurred in men; in this respect the affection is similar to the more ordinary forms of goitre usually met with in women. Notwithstanding this fact, however, anatomical dissection has shown that superior accessory thyroid glands have been much more frequently met with in males than in females, yet their development into tumours occurs, as a rule, in the female sex. Lingual goitre may occur at any period of life, though more generally it is found in women between the age of 15 and 40.

The presence of the growth may be perceived for a long time before any inconvenience arises from it. The tumour is situated upon the dorsum of the tongue, generally just behind or below the foramen cæcum. As a rule it occupies the mesial plane, but it may be a little to one or other side. Round or ovoid in shape, it varies from the size of a cherry or small nut to a man's fist. It is encapsulated, and it may either project from the dorsum of the tongue, or be buried in its muscles. There is no inflammatory condition associated with it, and enucleation is usually easy. It has a smooth, shining surface, but it is usually darker in colour than the surrounding mucous membrane. The consistency of the tumour varies; in one case being firm and elastic, in another soft and fluctuating, depending upon the structure of the tissue composing it. The formation of cysts within the swelling explains the fluctuating character of it.

The symptoms of lingual goitre depend largely upon its size, and are mechanically produced. There is a feeling of fulness in the throat, and the patient has a frequent desire to swallow. The voice may change its character, becoming thick or nasal in quality, or muffled and dead. Swallowing is interfered with, and fits of coughing may occur. There is one sign characteristic of lingual goitre, and that is the occurrence of profuse hæmorrhage, without any apparent cause. The patient simply becomes aware that her mouth is filled with fluid, which, on expectoration, is found to be blood. The hæmorrhages are due to rupture of the blood vessels which form a network over the surface of the tumour. The laryngoscopic mirror alone may reveal the presence of the growth in some cases, nothing being visible by mere inspection of the mouth. When the tumour is large, however, it may be felt upon deep palpation below the inferior maxilla.

Of the benign conditions from which this must be differentiated, there is lipoma, angioma, fibroma, syphilitic gumma, hypertrophy of the lingual tonsil, and cysts. The prognosis is favourable. The only rational method of treatment is removal, either through the mouth by the use of the galvano-cautery loop and by incision and enucleation, or by an external incision through the supra-hyoid region. The indications for each of these operations will depend upon the size and situation of the tumour. The buccal method is the best when practicable, when the growth is not very large and is situated rather high on the base of the tongue.

COLLARGOL IN THE TREATMENT OF OZÆNA.

As ozæna continues to prove so intractable, it is natural that new remedies should from time to time be suggested. One of the most recent of these is collargol, which has been so favourably recommended by Roques. Like many other therapeutic agents, however, its use would appear to have been attended with more satisfactory results in the hands of the individual introducing it than in those of others subsequently employing it. Oppikofer has employed the same remedy (*Arch. internat. de laryngol., etc.*, Paris, 1904, September-October), but he has not apparently met with the same success. The treatment is carried out as follows: The nasal cavities are first washed out very thoroughly, and they are then dried with absorbent cotton-wool. One then insufflates the collargol powder, directing it first along the floor of the nose as far as the posterior wall of the naso-pharynx, next along the upper part of the cavity, and then upon the middle and inferior turbinateds. Roques continued the treatment for eighteen days, during the first ten days repeating the insufflations twice daily; and later, once each day. As Roques only drew his conclusions from four cases treated in this way, of which two were completely cured and the remainder in the course of being cured, it would be fallacious to attach too much importance to this remedy. Oppikofer employed collargol in twenty cases of ozæna, and followed exactly the directions given by the former. In all the cases the symptoms were ameliorated, but in none could a complete cure be demonstrated. It would be difficult to estimate the part played by the lavage and the benefit derived from the insufflations. We are all conscious of the improvement that is met with in these cases when systematic and thorough washing of the nose is carried out. As the cavities were carefully cleansed under the guidance of reflected light, the efficacy of it was even greater than what could be obtained by a patient dealing with the condition himself. Control observations were made by cleansing both sides of the nose, and insufflating merely on one side. The result on the two sides was the same. Prolonged treatment with collargol did not effect a cure.

SOME DISADVANTAGES ARISING FROM THE USE OF PEROXIDE OF HYDROGEN IN THE TREATMENT OF MIDDLE EAR SUPPURATION.

PEROXIDE of hydrogen is now extensively employed in the treatment of middle ear suppuration, and it undoubtedly is very efficacious in a large number of cases. On account of its more general employment, it will not be out of place to call attention to one or two disadvantages that may arise in connection with it. These have been recently referred to by Bruder in a short paper (*Rev. hebd. laryngol.*, Bordeaux, 1904, September 17). It is very necessary that the quality of the solution used should be good, and that it should contain no impurities. The latter may cause considerable irritation, necessitating its discontinuance. Bruder points out that there exist in commerce three preparations of peroxide of hydrogen—the medicinal, the surgical, and the commercial: the first two do not contain impurities, and have no caustic action, hence they do not give rise to irritation. The commercial variety, on the other hand, is not free from irritating ingredients, which may exert a harmful influence upon the tissues. It is necessary, therefore, to see that a good quality is supplied.

One of the complications most liable to arise is inflammation of the skin lining the external auditory meatus, which may lead to considerable swelling of the parts and painful symptoms. We have ourselves observed complications of this nature, apparently due to the use of the peroxide, and subsiding rapidly after discontinuing it. Even when a good quality has been supplied, maceration of the lining epithelium has occurred, a complication which the author says may be avoided by first introducing a few drops of liquid vaseline into the orifice of the meatus. Bruder also draws attention to the painful symptoms which may arise from the use of hydrogen peroxide when cholesteatoma is present in the tympanum. Owing to the penetration and breaking up of the mass by the fluid, swelling occurs, with consequent pressure upon the surrounding parts. Severe pain may thus be produced, accompanied by giddiness, and even by symptoms suggesting the onset of cerebral complications. It is sufficient to point out these inconveniences which may arise from the employment of peroxide of hydrogen, and which must not be regarded as in any way detracting from its great advantages.

PUBLIC HEALTH.

UNDER THE CHARGE OF

J. BUCHANAN YOUNG, M.B., D.Sc. (Public Health),

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CHLOROFORM IN THE PREPARATION OF VACCINE.

AMONG a number of investigations in relation to the preparation of vaccine lymph, undertaken by the expert staff of the Local Government Board at the vaccine lymph laboratories, that by Dr. Alan Green (*Suppl. Thirty-second Rep. Med. Off. Local Gov. Bd.*, London) on the action of chloroform in removing the extraneous micro-organisms from calf lymph, is of outstanding importance. Dr. Green has been working at this subject for some years, and the results, both as tested by bacteriological methods and by actual use of the vaccines prepared by his method, show the high efficiency and possible utility of the chloroform process. By his experiments he has shown that, as a routine measure, the removal of the extraneous micro-organisms can be effected in two ways—(1) By passing a current of air and chloroform vapour through the emulsion for from one and a half to two hours, and subsequently placing the tubes containing it, sealed so as to retain the chloroform already present, in the ice-chest for from eighteen to forty-two hours; or (2) by passing a current of air and chloroform vapour continuously through the vaccine emulsion for six hours. The vaccine emulsion is prepared by triturating 1 part by weight of vaccine pulp with, as a rule, 3 parts of sterile distilled water by means of a lymph-triturating machine or a mortar and pestle. The water is absolutely necessary in order that the chloroform may enter into solution. A current of sterile air is then passed through pure liquid chloroform, the air in its passage becoming charged with chloroform. The mixture of air and chloroform is next passed through the vaccine emulsion, and the water in the emulsion becomes saturated with the chloroform, this saturated chloroform water being harmless to the specific germ of vaccine, its potency being unimpaired, while the extraneous organisms are speedily eliminated. Contact with pure chloroform, or exposure to the vapour of pure chloroform, of vaccine pulp undiluted with water, markedly diminishes the potency of the lymph. Many of the vaccines treated by the chloroform method contained a large number of extraneous micro-organisms, the average number being 20,000 per platinum loopful. In one case the number was 700,000. Like glycerin, chloroform fails to kill spore-bearing forms.

Up to the issue of his report, forty-five vaccines had been prepared with chloroform and issued for general vaccinating purposes. Each vaccine was carefully tested before and after treatment by chloroform, the vaccines for the series being taken from calves in whom the vesiculation suggested that the potency of the vaccine was not of great stability. In these forty-five vaccines the average number of extraneous organisms present in the untreated emulsion was 14,000 per platinum loopful. In every case these were eliminated, either after one to six hours of the chloroform process, or at the end of eighteen to forty-two hours subsequent storage, in the case of vaccines subjected to the passage of air and chloroform for only two hours. The vaccines were kept in the laboratory on an average for fifteen days after collection before being used. In all, 48,027 cases were vaccinated with the vaccines, with the following results:—

	Number of Cases.	Percentage of Success.	
		Case.	Insertion.
Primary vaccinations . .	35,873	97·8	91·2
Revaccinations	12,154	97·1	91·9
Total . . .	48,027	97·6	91·3

These figures show a very high "case" and "insertion" success. Some of the chloroformed vaccines had control glycerinated portions. The pulp collected from the calf was divided into two portions, one being prepared by Dr. Green's process and issued after an average interval of fifteen days, the other being treated by the ordinary glycerin method and issued after an average interval of seven weeks after collection. The chloroformed lymphs showed a rather higher "case" and "insertion" success than the glycerinated lymphs.

Summarising his results, Dr. Green states that (1) crude calf lymph can be freed from extraneous germs in from one to six hours; (2) vaccine, in times of urgent need, as during epidemics, can be much more rapidly prepared; (3) the vaccines thus prepared give a high "case" and "insertion" success; (4) by the immediate use of vaccines of potency of short duration, economy of material and calves can be effected; (5) in hot climates, where the preservation of the potency of vaccine for any length of time is often difficult, it seems probable that the early elimination of extraneous organisms might be of considerable advantage. Mr. Power, the medical officer of the Board, is of opinion that "should our expectations of this chloroform process (whether alone or in conjunction with glycerin) be realised, those urgent demands which arise suddenly during smallpox epidemics may be in future satisfied within two weeks from the date of vaccination of the necessary calves, instead of, as now, not until lapse of double or treble that period."

BACTERIAL TEST FOR POLLUTION OF AIR.

DR. MERVYN GORDON (*Suppl. Thirty-second Rep. Med. Off. Local Gov. Bd.*, London) gives the result of a prolonged investigation carried out by him with a view to obtaining a means of determining bacteriologically, in the air of public rooms, etc., the pollution resulting from the dissemination of saliva, etc., from the respiratory passages and mouth. In his present series of experiments he has directed his attention chiefly to an examination of saliva, and to experiments on the dissemination of saliva in the act of speaking. He bacteriologically examined the saliva from the mouths of twenty-five different persons to ascertain what micro-organisms were most abundantly present in saliva, and if any one organism could be regarded by its abundance and constant presence as characteristic of saliva. Such an organism he found in *Streptococcus brevis*, which, he states, is commonly present to the number of not less than 10,000,000 per cubic centimetre of saliva. This organism is readily recognisable by the fact that when grown in neutral red broth, the cherry-red colour of the medium is changed to canary yellow, showing in reflected light a green shimmer. Though this change can take place under aerobic conditions, it is more pronounced when cultivation is carried out under anaerobic conditions at 37° C. Minute traces of saliva produce the same change in neutral red broth under anaerobic conditions, owing to the presence and growth of the *S. brevis* contained in the saliva. For this reason neutral red broth "is, when incubated anaerobically for forty-eight hours at 37° C., a culture test whereby very minute droplets of saliva may be readily detected."

Dr. Gordon next proceeded to experiment as to the dissemination of droplets of saliva in the air of a room by means of loud speaking. He exposed, both in a large and in a small room, plates of neutral red broth at varying distances from the speaker, and proved by the subsequent incubation of the broth under anaerobic conditions, the presence in the air of particles of saliva at a distance of at least 40 ft. in front of, and 12 ft. behind, the speaker, who spoke for an hour. [These distances were the extreme points at which the air was tested.] Control plates exposed in the rooms for two hours previous to the commencement of the experiments demonstrated the absence of the *S. brevis* from the air. A streptococcus ("air streptococcus") was sometimes present in the air of the room before experiment, but it is easily distinguishable from the streptococci characteristic of saliva. Much seems to depend on the manner of speaking aloud. In one experiment, in which the reader, whose voice was distinctly heard 45 ft. away, did not exert the same energy as the others, no salivary streptococci were isolated from any of the plates, even from those quite near to the speaker. Two experiments were made to determine the aerial contamination associated with silence and ordinary quiet conversation, and "failed to show that droplets of saliva travel from the mouth into the air of the room during either of these acts."

Dr. Gordon considers that the streptococcus test for saliva "promises to be capable of application as an index of the possible access of morbific virus to air, in a sense similar to that in which the *B. coli* (etc.) test is an index of possible access of morbific matter to water," but points out that its value as a means of estimating pollution of air by breath-borne material, and as a test for efficiency of ventilation, is a matter for the future to determine.

VEGETABLES AND THE SPREAD OF INFECTIOUS AND PARASITIC DISEASES.

IN a research carried out on the vegetables in common use in Padua, Dr. A. Rizzoli (*Gior. d. r. Soc. ital. d'ig.*, Milano, 1903, No. 1) has obtained results which, in the particular circumstances, are so far reassuring. The experiments were made in vegetables usually eaten raw, including lettuce, fennel, radish, celery, endive, and strawberries. These vegetables and strawberries had been grown in gardens manured with human excrement, and irrigated with sewage water. The vegetables were freshly cut, and were cleaned, washed, and prepared as for the table, the washing being done with ordinary water containing from fifty to one hundred micro-organisms per c.c. Of each vegetable so prepared 100 grms. was taken, placed in a sterilised flask containing 1000 c.c. of sterilised distilled water, and the contents of the flask were violently shaken up so as to wash off all the adhering organisms. The liquid was then allowed to settle in the flask, surrounded by ice, and was used for cultures, inoculation of animals, and for microscopical examination.

The washings from fresh strawberries (previously unwashed) gave 353,000 per c.c., and those from the prepared vegetables varied from 31,725 per c.c. in the case of fennel to 100,424 for endive. The vast majority of the colonies were those of saprophytic organisms, though streptococci, staphylococci, and *B. coli communis* were sometimes found. The *B. typhosus* was never found.

Of fifty rabbits inoculated with the sediment, six died, and their blood contained streptococci, staphylococci, and *B. coli communis*. Of twenty guinea-pigs inoculated, four died, and *B. coli* was found in their blood; while among forty mice inoculated there were only a few deaths, the cause of death being uncertain.

In the microscopical examination of the sediment, no eggs of cestodes were found, and on only one occasion the eggs of *Ascaris lumbricoides*. The eggs of earthworms and of insects were common, as were also protozoa, monads, and vorticellæ. Amœbæ were also sometimes present.

REPORTS OF THE MEDICAL SOCIETIES.

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Glasgow Medico-Chirurgical Society.—*October* 7, 1904.—Dr. T. K. **Monro** showed a female cretin, æt. 23. Her height was 41 in. She was unable to talk, and walked with difficulty. On thyroid treatment she acquired a more intelligent look, gained 2 in. in height, and improved in walking. The thyroid was represented by a thin cord passing across the trachea. Skiagrams of the limbs showed the epiphyses of the long bones were not united to the shafts.—Dr. J. H. **Nicol** showed—(*a*) Specimens from a series of cases in which the appendix was found in an abnormal situation. (*b*) Calculi removed by operation, including salivary, biliary, pancreatic, intestinal, renal, ureteral, vesical, prostatic, and urethral. (*c*) Case of hydrocephalus treated by peritoneo-meningeal drainage. In those cases Dr. Nicol removes a lamina and transverse process from one of the lumbar vertebræ, and opens the peritoneum from behind. He then either fixes the omentum in the wound, with the object of establishing a permanent drain between the spinal canal and the peritoneum, or he inserts a drainage tube, stitches up the wound, and removes the tube about a month later by a second operation. (*d*) Case of mastoidectomy with preliminary occlusion of the internal jugular vein.—Dr. G. H. **Edington** read notes on the excision of tuberculous glands of the neck.

Glasgow Pathological and Clinical Society.—*October* 10, 1904. —Professor **Muir**, President, in the chair.—Dr. T. K. **Monro** showed two cases of muscular atrophy of the peroneal type. The affection in both cases was attributed to an attack of measles, but the causal relationship is somewhat doubtful, as the first signs of the paralysis, which developed very gradually, were only noticed about two years afterwards. The one patient is 13 and the other 10 years old; they are brother and sister. The paralysis and wasting are now, in the one case five and in the other case seven years after the attack of measles, very marked.—Dr. **Freeland Fergus** described a new operation for ectropion due to blepharitis marginalis, and showed a patient on whom the operation had been performed. The result appeared to be most satisfactory.—Dr. **Freeland Fergus** made some remarks on the tests for binocular fixation. The various forms of stereoscope were shown and discussed. None of them quite satisfied the requirements of Dr. Fergus in respect of ensuring that the three dimensions were really appreciated; he had found that the best tests were "Plastographs."—Dr. **Walker Downie** and Dr. **John H. Teacher** showed a specimen of cancerous tumour of the thyroid gland which had caused death by penetrating into the trachea.—Dr. **Henry Rutherford** described a case in which a hydronephrotic cyst, which contained seven pints of fluid, was removed through the abdomen, from a boy æt. 7. The patient made a perfect recovery.—Dr. G. H. **Edington** showed as card specimens—(*a*) A ruptured kidney removed by operation; (*b*) an intussusception removed by operation.

Forfarshire Medical Association.—*October* 7, 1904.—Dr. **M'Vicar** showed a boy upon whom he had operated for diffuse suppurative peritonitis, following appendicitis.—Dr. M'GILLIVRAY showed a case of relapsing hyphæma, and a case from which an unusual calcareous deposit had been removed from the left cornea.—Dr. DEVEREUX exhibited and explained the working of Harcourt's chloroform inhaler, which had been in use for several weeks in the Royal Infirmary.—Dr. BUIST showed an uterus removed per vaginam from a nullipara, æt. 51.—Dr. M'VICAR showed a stomach with large cancerous tumour of pylorus, removed post mortem.—Dr. BUIST, in a paper entitled "The Doctor in Molière," gave an interesting account of the medical man as depicted in his plays. —Dr. M'VICAR read notes on a series of cases of perforative peritonitis, associated with appendicitis, rupture of ulcer in typhoid, and other lesions in the lower abdomen.

ANALYTICAL REPORTS.

ADRENALIN OINTMENT; ACETOZONE INHALANT; ADRENALIN INHALANT.

(Parke, Davis, & Co., London.)

PARKE, DAVIS, & Co. have sent us samples of these three preparations noted above. We have before now spoken about the efficacy of adrenalin in stopping bleeding of all kinds. They have now brought out a very neat form whereby to administer ardenalin as an ointment, of the strength of 1 in 1000. The ointment is made up with a bland, oleaginous basis, combined with adrenalin chloride in the above proportions. The compressible tubes in which it is provided have screw tops of a new character, being long and pointed, so as to enclose a prolonged nozzle from the tube.

Another preparation of adrenalin issued by the same firm is the adrenalin inhalant of the same strength as the ointment. It is a bland oil solution, containing, as well as the adrenalin, 3 per cent. of chloretone. Its use is the same as that of the ointment. The hæmostatic and astringent effects of adrenalin are so well known nowadays that it would be superfluous to add anything more to our previous remarks about it. We can, however, confidently recommend for general use these two preparations.

The acetozone inhalant is made up of refined liquid petroleum as the basis, with 1 per cent. of acetozone and 0·5 per cent. of chloretone. It has been devised for use in an atomiser "especially designed for oily liquids." Acetozone is a powerful germicide, deodorant, and local antiseptic. It has proved of considerable use in cases of nasal catarrh.

"GRAND PRIX."

The Apollinaris Co. Ltd. announce that the Grand Prix at the St. Louis Exhibition has been awarded to Apollinaris Natural Mineral Water.

The Apollinaris Spring was discovered in the year 1851, and the bottled water is exported to all parts of the world, the sales now amounting to 30,000,000 bottles annually.

EDINBURGH MEDICAL JOURNAL.

EDITORIAL.

The Drink Question Once Again.

SCIENCE has spoken, fanaticism has dogmatised, the Church has warned, the social reformer has theorised; hand-in-hand the four have even set out with some show of sincerity upon their crusade, but still the drink question remains very much in the position it occupied fifty years ago. Is there anything new to be said upon the matter? Perhaps not; but there is certainly this fact to be emphasized—that the matter can no longer be allowed to remain as an academic question, nor can its solution be left to the municipal trifler, the teetotal theorist, or the indifferent cynic. We must ignore the man who has axes to grind and logs to roll, we must waste no more precious hours listening to the diatribes of the quack who professes to sell a universal pill for the frailties of human nature, we must try something more effective than the cynic's doctrine of *laisser faire.* We must get back to humanity, find out the cause of the disease, and remedy it on common-sense lines. Eliminating for the moment the consideration of those cases where intemperance is but a symptom of a grave mental disease, or of gross social irresponsibility, let us deal with the man of average power of control and of normal social instincts. What are the three things he demands in his hours of leisure? Space, interest, and variety. Mankind from its earliest days has called for space, for a wider world, for a place wherein to stretch its arms and legs. Man is by instinct a vagabond; he must not be cramped; he must have room to turn round, to realise that there is such a thing as freedom. In the second place, he must have interest, for if that is denied him, he will, in the end, demand excitement. Interest is the safety-valve of the moral steam. Seal it up, and it will eventually burst the boiler that holds it. As long as you keep a man interested he has little craving for excitement; but if you keep him dull and confined and bored, his energy will eventually burst out in some abnormal way. Then he must have variety. Monotony is the father of riot, the parent of revolt. What are the bearings of these reflections on the matter in hand? There can be no doubt that the main cause of intemperance in this country is one of environment. "Cribbed, cabined, and confined" in the narrow cells of their home life, the labouring classes are compelled to seek space and light and interest, and for the want of some more appropriate places, they find them in the public-houses, whose airy, well-lighted, gorgeously-decorated halls are in striking contrast to the gloom and oppression of their own over-populated, under-decorated, under-ventilated homes. It is of no use for the self-righteous to tell a man, in unctuous tones, that he must be content with his lot. Contentment is a highly righteous but a wholly impracticable doctrine to preach to the average of mankind. Self-control is the first of all virtues, but it is bound to fail if it is to lead to the complete martyrdom of desire and of human instinct. "We are men in a world of men, not gods," and as such we must be dealt with. The human soul demands its franchise, and will not be robbed of its birthright by preacher or by policeman. Accordingly all reform, outside the precepts of example, instruction, and education, must start by recognising the claim mankind puts in for space, for interest, and for variety. Ninety per cent. of the energy spent on preaching and inveighing against sin must be surrendered to a practical attempt to meet these natural, human, and harmless demands. We must, in fact, meet the publicans on their own ground. We must try and cut the ground from under their feet. How is this to be done? By a universal attempt by Government, municipal authorities, social and sanitary societies, and last, but certainly not least, the Church, to supply space and amusement for the people. Outside the area of education, salvation lies practically in that direction. Let us then frankly recognise the claims of human nature; we may call them frailties or limitations if we please—the mere labelling of vices or tendencies does not get rid of them—and attempt to meet them in a rational way. For every public-house let us have a coffee-room; let us have working-men's clubs; let us make systematic attempts to interest and entertain. Let the matter rest no longer in the lap of irresponsible amateurs. If the desire for reform be sincere, let the Church devote a large portion of its moneys to this attempt to improve the environment and correct the taste of the people. Let the main work of the Church be done out of doors. Let it stretch out hands to ameliorate those for whom its work is chiefly intended, and let not all the means of salvation go to those who need little saving. We are quite willing to admit that much is already being done in this direction, but from our point of view that "much" is but a drop in the bucket. The movement must be extensive, vital and human, unfettered by the ignorance of fanaticism and the dogmatism of theorists who fail to realise the limitations of human nature. We must have people's palaces, concert halls, gymnasia, cafés, and polytechnic institutions. For our own part, we would sooner be taxed for these than for public libraries in which the circulation is chiefly concerned with works of fiction. We have nothing serious, however, to say against libraries. But they must form only part of the scheme of reform, not the whole of it. Now is the time when the social reformer might sow with the hope of a great harvest. Human nature is not depraved. It is only limited in its powers of righteousness and its capacity for self-abnegation and self-control. It has been truly said, that every state possesses as many criminals as it deserves. The deduction from this is obvious, and every time the citizen meets a drunkard, let him question himself as to his personal responsibility in the matter. We do not look for grandmotherly legislation nor puritanical tyranny, we are only urging the powers that be—of which every citizen is a living factor—to alter a little the weapons of social reform.

The Working-man and the Public-house.

THE member for Battersea has recently expressed some views which have rivetted the attention of all who are interested in the welfare of the people, but as the speech which he delivered in Manchester was not published until the beginning of last month, it has not been possible to make any reference to it until the present number. Mr. Burns has made an honest and courageous attempt to bring before the working-men of this country the enormous evils which follow in the wake of intemperance. A few sentences may be quoted from his speech. "The tavern," says Mr. Burns, "has for centuries been the antechamber to the workhouse, the chapel of ease to the asylum, the recruiting station for the hospital, the rendezvous of the gambler, the gathering-ground for the gaol. Alcohol pollutes whatever it touches. It enervates where it does not enslave. It destroys slowly what it does not degrade quickly. For the individual it is a malignant disease, for the community it is a murrain, for the nation it has become a self-inflicted obstacle to all phases of progress. Drinking is bad enough in the prosperous, but on the poor it is an additional load, piled upon their own backs, too often by their own hands, and nearly always at the time they are least able to bear it. From their strength as a class, from their powers of endurance as individuals, and from their capacity as craftsmen, it is a never-ending drain. It irritates where it does not brutalise, and makes for discord, strife, and bitterness, where calmness, sobriety, kindness, and decency should prevail. It undermines manhood, enervates maternity, and dissipates the best elements of human nature. As was said of it by Lord Brougham, "it is the mother of want and the nurse of crime." These are brave and true words, with which it is impossible not to sympathise. So far as we have been able to gather, Mr. Burns has not found himself in a position to propose any new remedy for the evils which we all deplore. He is evidently too honest to claim for his own party any monopoly of attempts to lessen the evils attendant upon the traffic in alcohol. Both of the two great political bodies in this country are equally subservient to the influence of the drink trade, and this may be beautifully illustrated by saying that a Dewar sits on each side of the house. Mr. Burns urges the practice of abstinence and the diminution of licensed houses, and we are at one with him in both of these recommendations.

A Manchester Medical Hero.

It is one of the most pleasing duties of professional piety to keep green the memory of the great men to whom we are indebted for advances in knowledge. It was a happy inspiration that led Dr. Cullingworth to follow in the footsteps of many others who have rescued distinguished names from oblivion, and to devote his address before the Medical Society of Manchester to the subject of "Charles White, F.R.S., a great provincial surgeon and obstetrician of the eighteenth century." Dr. Thomas White, the father of the subject of this address, was the grandson of Charles White, Member of Parliament for the county of Nottingham, and Colonel of a regiment under the king in the great Rebellion, during which he lost his estate near Greasley. These facts are obtained from the fly-leaf of an old "Breeches Bible" of date 1578, which apparently came into possession of the White family about the time of Charles White's birth. He was a thorough Manchester man, born and educated in that town. As a boy he assisted his father in practice, and was afterwards sent to attend lectures and hospital practice in London, where he made the lifelong friendship of John Hunter. He extended his London experiences by spending a winter in the University of Edinburgh, which was then enjoying one of its most brilliant epochs. On returning to Manchester, he joined his father in practice, and very speedily established an enormous reputation. With mental endowments of the highest kind, and physical qualifications marked by remarkable endurance, it is no wonder that he speedily became the head of the medical profession in the North of England. Of this we have external evidence on all hands, but the most interesting proof is to be found in De Quincey's autobiography. Speaking of the death of his sister, he refers to her medical attendants, one of whom was "Mr. Charles White, the most distinguished surgeon at that time in the North of England."

Very soon after his return from Edinburgh, the project of a hospital for Manchester seems to have been discussed, and in

1752 Mr. Joseph Bancroft, a friend and admirer of the distinguished young surgeon, offered to defray all the expenses of such an institution for a year, if Charles White would consent to give his professional assistance. The proposal was entertained, and a small house in Garden Street, Shudehill, was hired and opened for the treatment of the sick. In such a modest fashion the Manchester Infirmary was started on its successful career. How like this is to the beginnings of the Infirmary in Edinburgh, with the "small hired house," in Robertson's Close, of 1729! Charles White was not merely responsible in a great degree for the foundation of the Infirmary, but it was also in great part due to his exertions that the Maternity Hospital, now St. Mary's Hospital, was instituted, and in connection with this branch of practice he won many of his laurels. Both as a surgeon and as an obstetrician he published a number of remarkable contributions, several of which were of the highest value. He must have been a man of powerful intellect and versatile character, possibly rather high-handed, like many strong men, in certain of his relations, but, taking him all in all, he was a man of whom Manchester will always feel proud. Dr. Cullingworth's address is throughout characterised by a sympathetic tone, and he has earned the gratitude of all who are interested in the history of medicine.

Hygiene in Khartoum. To look back upon the events of the last two decades in Egypt is almost like casting the eye upon the changing pictures in a kaleidoscope. Just twenty years ago, when the policy of "scuttle," with its humiliations, obtained sway over the minds of those then responsible for the government of this country, he had need be a bold man who would have ventured to prophesy that the British and Egyptian flags would again be raised in the Sudan; and yet here we have the Report of the Research Laboratories in the Gordon Memorial College of Khartoum! It is certain that no better man than Dr. Andrew Balfour could have been selected for the post of Director of these Laboratories, as well as of Medical Officer of Health for Khartoum, and of Sanitary Adviser to the Sudan Civil Medical Department. Distinguished in medical research and in sanitary science, endowed with high gifts of imagination and great versatility of attainment, and possessing in a remarkable degree the aptitude for all forms of sport, Dr. Andrew Balfour was the very man for the post. In this first report he shows how admirably fitted he has been for the office of Director.

The Report begins with an introduction, in which there is a full description of the Wellcome Laboratories. It is obvious from this that the Laboratories are admirably equipped in every respect for the work which has to be carried on in them. The Report itself consists of a most interesting description of mosquito work in Khartoum and the Anglo-Egyptian Sudan, in which is embraced not merely a list of the numerous species of mosquito found, but all the methods which have been adopted for their destruction. We learn that a total destruction of 222,000 mosquitoes is indicated, and, calculating the number of eggs which these might have produced, it must be evident that an enormous depletion of the ranks of the winged hosts has been undergone. In a second paper of the Report, that on "Biting and Noxious Insects other than Mosquitoes," a most interesting discovery is mentioned—*i.e.*, the discovery of *Glossina morsitans*, a species of tse-tse fly. It is the carrier of the trypanosome of the affection so fatal to many domestic animals, and it has not been reported north of Runbeck previously.

Amongst the other reports contained in this volume will be found papers on "Insects and Vegetable Parasites injurious to Crops"; on "Cyanogenesis in *Sorghum vulgare*"; on "General Routine Work"; and on "Eosinophilia in Bilharzia Disease and Dracontiasis." The final part of the Report consists in a paper by Mr. Theobald on "The Mosquitoes of Egypt, the Sudan, and Abyssinia," characterised by honest work, succinctly described.

The Report as a whole is one of which any laboratory might well be proud, and when it is considered that it emanates from a town which just six years ago was still the headquarters of that rule which the lamented Steevens called "a monstrosity of African lust," it is nothing short of marvellous. We desire most heartily to congratulate the Director upon his success in the office which he holds, and to express our warmest hopes for the future of the institution which he so greatly adorns.

ORIGINAL COMMUNICATIONS.

PAST AND PRESENT.[1]

By Sir JAMES CRICHTON-BROWNE, Kt., M.D., LL.D., F.R.SS.
(Lond. and Edin.).

IT is just forty-four years since, while still a fourth-year student in the University, I took possession of this Presidential Chair with feelings of exultation that have known no parallel since, and although rough contact with the world has shattered illusions and time has brought sexagenarian disenchantment, I occupy it again this evening with a sense of pleasure that almost persuades me that it is in the region of emotion that reality is to be sought. A rippling stream of memories, jocund with the light of youth and hope, flows in upon me, and I recall a brilliant band of young men who gathered in this hall—a veritable land of promise then—to barter their intellectual wares, to engage in wit combats, and exchange their tokens of life-long friendship. I am a dutiful and devoted son of my Alma Mater. I turn to her with unabated respect and confidence, even although the only communications I have received from her since she sent me forth from her lap have been appeals for pecuniary assistance. I am proud of her motherhood, but at the same time I do not hesitate to say that she was, in my time, somewhat of an *arida nutrix,* and that the Royal Medical Society, as a kind foster-mother, afforded to a group of her offspring the sort of sustenance which she denied them. That may sound to you the language of exaggeration, but the times have changed, and you; with your modern advantages, can scarcely realise the baldness and austerity of student life in Edinburgh in the early sixties. There was no Students' Union in those days. There were no collegiate residences. There were no laboratories, except one in which a meagre course of instruction in practical chemistry was given. There was no tutorial system, and only one crammer. The teaching outside anatomy, botany, and clinical medicine and surgery was exclusively by lectures, and the extent to which the men availed themselves of these was left to their own discretion, tested by an occasional and not altogether immaculate collection of cards. There was no professional examination for degrees until the end of the third year, and then a candidate was expected to exhibit his proficiency in anatomy, chemistry, physiology, botany, and natural history at one and the same time, clearing off in the following year all the other subjects. There were no social gatherings to which students were bidden, except medical missionary meetings. There were no sports or pastimes in connection with the University open to them except snow-balling, of which, when the weather permitted, they freely and sometimes indiscreetly availed themselves. There were no amusements except the Reid Concert, to which they had occasionally to effect a forcible entrance; and the botanical excursions in summer, which filled the vasculum with disregarded weeds, but stored the memory, in days when there were no kodaks or picture postcards, with delightful glimpses of Scottish scenery.

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[1] An address delivered before the Royal Medical Society, Edinburgh, October 1904.

Do not mistake me, I have no thought of disparaging "the brave days of old" in which, while a callow youth, I was privileged to study medicine here. I would rather extol and magnify them in their Spartan hardihood, and maintain that what they lacked in tenderness was compensated by what they conferred in strength and independence. The Professoriate in those days was a galaxy of talent and genius, to say nothing of the variable stars of the Extra-Academical school that circled wistfully around it. Never before nor since has the Medical Faculty boasted names more illustrious than those of Goodsir, Syme, Christison, Simpson, Playfair, Traill, Bennett, Laycock, Balfour, Allman, and Miller. The teaching was admirable, practical, philosophical, and in the highest degree stimulating. The spirit abroad was earnest and sincere. There was no medical school in Europe at that date that afforded a more thorough training; but medical schools were not then organised as they are now, and their shortcomings then, according to our modern notions, were, in the case of Edinburgh, in some measure made up by the Royal Medical Society. Here were given facilities for good fellowship amongst students greater than those that the classrooms or even the dissecting-room, with mutual proprietorship in a part, afforded. Here was made possible familar intercourse between seniors and juniors, raw freshmen and young graduates, infirmary interns and learned professors, for one or two of the latter occasionally attended and took part in some special debate, and nearly all of them came to the annual dinner. Here was furnished a quiet and cleanly retreat from the dingy, sometimes squally, and always insanitary, lodging in Lothian or Rankeillor Street. Here were formed reading parties for mutual improvement by the use of the plates in the library, the single skeleton and few articles of materia medica which the museum contained, or the monsters of the deep, ending their days, not inoffensively, in the aquarium. Here was budded and evolved the critical faculty or power of independent thought for the man who with unquestioning servility accepted, ex-cathedra, deliverances and the pronouncements of the text-books, perked up his judgment as he listened to the infallibilities of a paper by a beardless compeer. Here was awakened intellectual initiative when the necessity to produce an original communication of some kind, either by native industry or thought-lifting, was realised. Here were bestowed enlargement of vision and breadth of view by the range and variety of the subjects discussed. Here was fostered the wholesome sentiment of professional citizenship by the proud traditions of the Society in the past, and the sense of obligation to live up to these. Here was acquired an elementary acquaintance with business and affairs by service on the finance, or the dusting or other committees, and by the orderly regulation of the proceedings.

I look back with genuine gratitude to what the Royal Medical Society did for me and the men of my time, not only in a social and recreational, but in an educational way. It not only kept us in touch with every advance in the healing art—and in the days when I was serving my apprenticeship here, from 1858 to 1862, acupressure and local anæsthesia, then first introduced, were demonstrated in this hall — but it supplemented the teaching of the schools, and gave us cognisance, if not comprehension, of the progress of scientific speculation and discovery. And as regards scientific speculation and discovery, the period I have indicated was a stirring and a pregnant one. Darwin's "Origin of Species" was published in 1859, and Virchow's "Cellular Pathology" in the same year. Berthelot's "Organic Chemistry Founded on Synthesis" and Fechner's work on "Psycho-Physics" appeared in 1860. Pasteur's work on "Microbes" and Claud Bernard's on the "Mechanism of Sensation" followed in 1861. And with the gist of all these epoch-making works we were promptly made acquainted here. It may be said that we busied ourselves with matters too high for us, and would have been better employed in studying the bones or in bandaging. To some extent I admit the impeachment, and allow that as things are now it is impracticable for the medical student to keep abreast of the general science of the period or even of biological science as a whole; but, on the other hand, I feel that virtue did go into us, in the days of which I am speaking, out of the wide field and diverse topics in which we interested ourselves, and I am convinced that the high position attained during the last half of the last century in London and all the great provincial towns of England by Edinburgh graduates, has been mainly due to the fact that, more than the *alumni* of other medical schools, not excepting the great English universities, they were tinctured with science. They were never mere apothecaries or saw-bones or general practitioners, but men of light and leading, with something beyond trade instincts. On running over the list for the last fifty years of the past Presidents of the British Medical Association, which, as you are doubtless aware, holds its annual meetings in all the great towns in the kingdom in succession, and selects in each, as its President, the leading practitioner there,—I find that of the fifty, not fewer than twenty were graduates of the University of Edinburgh, and that of these twenty a very large majority were past Presidents of the Royal Medical Society.

But it was not merely a theoretical or second-hand knowledge of science in all its branches that we cultivated here. When it was possible we had demonstration and experiment. No sooner had the spectroscope, perfected by Kirchoff and Bunsen, come upon the scene in 1859, than it was introduced to us here by Professor, then Mr. Arthur, Gamgee, and from him I had my first lesson in spectrum analysis. A little later, a physical problem having arisen, an expedition, of which the late Professor Alexander Dickson and Professor Crum Brown were members, was fitted up and sent forth from this building, to determine by direct experiment the effect of a flask of olive-oil in smoothing the troubled waters of Dunsappie.

Beyond, however, its science teaching, the Royal Medical Society brought to bear on us many salutary educational influences. It spurred us on to reading, that we might worthily take part in the weekly debates, and although the reading was discursive and fragmentary, it was not without its permanent value, for occasional dissipation is not less necessary than persistent concentration to the best sort of intellectual development. It put mettle in our brains, and made us ready in thought and nimble in utilising such knowledge or ignorance as we possessed. It enabled us to find our level and our *métier*, for here those who have subsequently proved the best men generally came to the front, while many men discovered here in what direction their individual tastes and aptitudes lay. In the old dusty manuscript communications here—if they are still preserved—lie buried the seeds of many a goodly and now wide-spreading tree of medical and surgical knowledge, for many men who have climbed to eminence in our profession here gave the first clear indication of the route by which they were to achieve it. In my time Sir Thomas Grainger Stewart contributed a paper "On Reflex Action and Amyloid Degeneration of the Kidneys"; Sir Dyce Duckworth, "On Gout"; Sir Thomas Fraser, "On Immunity"; Professor Pettigrew, "On the Heart"; the late Dr. John Duncan, "On Arresting Hæmorrhage"; Sir Lauder Brunton, "On Mercury." And yet there was no narrow specialism about us, for we all spoke on all subjects, and I well recollect hearing the present Attorney-General for England, Sir Robert Bannatyne Finlay, discussing surgical wounds, and Professor Cheyne making a few gynæcological observations.

To us, in the sixties, the Royal Medical Society supplied many of the elements of the collegiate life in which the University was deficient, and thus created a strong claim on our affections. I am not a Mason, and know nothing of the mysteries of the craft, but wherever, in my wanderings, I have come across an extraordinary member of this Society, a delightful and helpful *camaraderie* has been at once established. Were I a millionaire I should show my indebtedness to it by an enormous donation to its funds, with an express stipulation that, however applied, it should not be expended upon upholstery, for it is refreshing to come back here in these swiftly changeful days and find the same wall-papers, the same benches, the same ballot-box, and, I verily believe, the same carpets and door-mats, with which I was familiar forty years ago.

I have spoken of this Society as it was upwards of forty years ago, and all its characteristics then are indelibly engraven on my memory, but on its position now I feel scarcely competent to enlarge. In view of this meeting, and of the names of the Presidents in recent years, and of the list of your coming papers, it cannot be alleged that the glory has departed from it; and yet I suppose it would be correct to say that its rôle has been circumscribed, and that it no longer plays the important and unique part it once did in the Edinburgh Medical School. That is the inevitable consequence of the altered methods and increased exigency of medical study. The medical students of my days were a more leisured class than you are. They were allowed more spontaneity and personal direction; they were less harried by examinations; there was less for them to learn—not in general principles, but in technical detail. Anatomy in all its branches was then as thoroughly and systematically taught by Goodsir and Turner as it is to-day, but the niceties and scrupulosities of aseptic and antiseptic surgery had not yet been invented, but were still simmering in the mind of Lister, who came here now and then as a visitor to utter words of wisdom, and especially when, by his sweetness and suavity, he could smooth down the domestic squabbles that sometimes agitated our body. Experimental physiology in the University was limited to the decapitation of one frog per annum. There were no blood-counts, Widal reactions, stomach-contents analyses, qualitative determinations of uric acid, chlorides, sugar, to be carried on. Normal histology was taught by Bennett, gross morbid anatomy in the post-mortem theatre by Haldane; but there was no well-equipped pathological laboratory, and bacteriology was still in the womb of the future. The natural orders of plants, the *Thalamifloræ* or *Calicifloræ*, had to be mastered, but this was done by a resolute struggle with Balfour's "Botany" in a back room, with the result, as the professor acknowledged, that the man who could patter off with the strictest accuracy the characters of the *Papaveraceæ*, was quite unable to identify a poppy when it was personally presented to him at the oral examination. The men of the time of which I am speaking had to work hard—the best men worked quite as hard as the best men do now—but in a different way, and in a way that left them larger opportunities of taking advantage of the facilities for self-culture offered by a Society like this. The demands made on you to-day in your ordinary course of study are absorbing, and are likely to grow, if there be room for increase. It seems certain that in all medical schools the tendency is to bring clinical medicine and surgery into more and more intimate relation with the most recent developments in the sciences of chemistry, bacteriology, and morbid histology, and to make blood-counts and other elaborate investigations, which have hitherto been carried out only in special diseases where they were necessary from a diagnostic point of view, a piece of routine practice. I hear that at Johns Hopkins University at Baltimore as long a period as three months is spent on blood-work alone. In all medical schools the laboratory and practical side of the teaching is being developed, and clinical teaching systematised and amplified; in all, increased inducements, in the allocation of rooms for special purposes, and in the supply of apparatus, reagents, and material, are being held out to students to work for themselves in making chemical, microscopical, pathological, and bacteriological observations. In all, increased individual supervision and skilled assistance are given, and almost every hour of the day is parcelled out to definite and specific studies, and the result is that lectures as a means of instruction are, as I think, unhappily, falling into disrepute, and that neither time nor energy is left to the student, to make full use of a Society like this.

But notwithstanding the encroachments made on its former domain, and the crowding out to which it is subjected, there is still, I believe, ample scope for this Society, and certain services which it is specially qualified to render to the senior students and junior practitioners of Edinburgh. It can still offer to them, apart from its social advantages, which, although shorn of their former lustre, yet remain, certain educational advantages which the most sumptuously equipped laboratories and careful ward-work cannot supply. It can still offer to them, for instance, an arena in which to exercise and train their power of speech. It can offer them an opportunity of getting over stage-fright and of acquiring the art—for it is an art—of expressing their ideas in an orderly and coherent way, suitable to a public audience. Ours is not a talkative profession, thank Heaven! There is silence in the operating theatre, there are but few words at the bedside, and yet every medical man should, on occasion, be able with lucidity and without painful embarrassment, to say that which is in him, either to a scientific or a popular assembly; while, as medicine becomes more preventive and less curative—as it surely will do—there will be an increased demand for teaching by the profession of hygiene and prophylaxis, in language understandable by the people. Many of you, moreover, will become teachers in a special sense, and as lecturers and professors—I fancy I see a whole embryo Senatus Academicus before me—will have to convey knowledge to groups of pupils, and your success in that capacity will depend scarcely more on the knowledge itself than on the vehicle in which it is conveyed. It is very desirable, therefore, that all of you should acquire betimes a certain degree of skill in public speaking, which is entirely different from private conversation, so much so that the man who shines in colloquial intercourse may be a stammering dullard on the platform, and the fluent orator but a dry stick in the ladies' boudoir. And skill in public speaking is only to be acquired by practice, and practice is needful alike for those who are naturally endowed with a rich gift of language and for those who are born with but a scant fund of it. On the first class, practice confers that discipline which prevents their rich gift from running to what Laycock called logo-diarrhœa; in the second, it overcomes hesitancy, and enables them to make the best possible use of the instrument at their disposal.

I have said that the art of public speaking must be cultivated betimes, and for that there is a physiological reason. It is dependent upon high and special functional activity of Broca's convolution, the third frontal, destruction of which causes aphasia and agraphia, and of the sensory centres behind the Rolandic area, destruction of which causes amnesia. Those centres, like all other brain centres, except those on the lowest level, such as the centre for co-ordinating the movements of sucking, do not come to maturity all at once, but have their nascent or growth period, which is sometimes short, as in the leg centres, for walking and kicking are early accomplished, and sometimes long, as in the hand centres, which go on evolving from the first feeble grasp of infancy up to the supreme manual dexterity of the artist or artificer, which is not attained until about the twenty-fifth year. The nascent period of the speech centres is probably longer than that of the centres for the hand, for the highest literary excellence and command of language are often not reached until middle life, but its most active stages are from the first to the twentieth year, when verbal education is being carried on, and when the range of speech may be seen gradually expanding from the monosyllabic vocabulary of the nursery, through the prattle of the child and the varied gabble of the schoolboy, up to the copious diction of the lover who can indite a ballad to his mistress' eyebrow.

Now, it is with the speech centres as with other cerebral centres, they must be exercised and trained during their nascent period if they are to attain to their highest possible functional usefulness. It is while their systems of fibres are being encased in their myelin sheaths, and so insulated and made ready to conduct nerve currents, while the nerve cells or neurons, round in fœtal life, are shaping themselves and putting forth buds and branches or dendrons, which by continuity or contact, or a leap in the dark (who knows which?) place them in communication with each other, and while the association systems are still in process of formation, that the cerebral centres can be stimulated to development and quickened to vigorous life. If the nascent period is allowed to slip past unimproved, a deficiency remains for which no subsequent labour or diligence will compensate; but if it has, by appropriate exercise, been taken advantage of, then there is a gain which is never afterwards lost. Two cases have been recorded, in which, on post-mortem examination of the bodies of adults who had suffered amputation of a leg, by constriction of the cord in intra-uterine life, the leg centres in the brain, corresponding to the lost limb, were found visibly stunted and imperfectly developed. These centres not having been called into exercise at their nascent period, had failed to grow. On the other hand, many cases have been recorded in which, on the post-mortem examination of persons who had had legs amputated in adult life, living for years afterwards, the leg centres have been found of average and proportionate size, although presenting some chromolytic changes. In these cases the centre, having been duly and sufficiently exercised at its nascent period, and having established communications with other centres, was not altogether thrown out of cerebral activity on the removal of its subtending limb, but remained still contributory to ideation and well nourished. And with all other centres it is the same. The infant reared in swaddling bands, and with eyes blindfolded and ears stuffed with cotton-wool, must turn out an idiot.

As regards the speech centres, it might seem that there is little danger of their being inadequately exercised. "In this distracted age," says Carlyle, "all education has run to tongue"; but the point I wish to impress upon you is, that there is differentiation in the centres in a series, and in each centre as far as a centre can be individualised, and that the exercises provided should have reference to the stage of evolution. In all industries in which a high degree of manual skill is required, it has been found that the hand that has been left untrained until fifteen or sixteen years of age—that is to say, until the most active stage of the nascent period in that part of the centre concerned in manipulative movements is over—can never attain to great proficiency, and that the hand, the training of which is still further postponed, becomes no hand at all, but a mere bunch of thumbs. But I need scarcely remind you that there are other hand movements, those involved in artistic performance, and controlled by the finer emotions and higher intellectual powers, that can only be profitably exercised at a later age, so as to insure the best possible excellence.

And so with the speech centres, a graduated training is necessary if they are to do their best, and this is, of course, recognised in primers and lesson books, which proceed from the simple to the complex, and in the school curriculum generally, which has, indeed, hitherto been far too exclusively linguistic in its arrangement. But after the school period there are, it seems to me, certain steps in the unfolding of the speech centres, regard to which should be had in the higher education. And one of these is the step extending from the eighteenth to the twenty-fifth year, when the training of the speech centres for use in public speaking may be most successfully conducted. Public speaking is, as I have hinted, and as is indeed obvious, something above common speech. It involves a high degree of fusion of sensory and motor elements drawn from a wide area, great inhibitory power, and a measured and orderly rate of nervous discharge. It can only be learnt by listening and practice, and listening and practice to be most fruitful should come in adolescence, just as that epoch when you are participating in the debates of the Royal Medical Society. I do not exactly know at what age Demosthenes munched his pebbles, but I fancy that as his ambition to excel in eloquence was fired by his being present while still a boy at one of the triumphs of Calisthenes, it must have been just when he would have been an ordinary member here, had he been an Edinburgh medical student. The ablest public speakers I have met have told me that they began young, and I am confident that by moderate exercise in tongue fence, in this lingual gymnasium, in the days of your youth, while your speech centres are still plastic, mobile, and prolific, you will possess yourselves, more or less, of an accomplishment which will be exceedingly useful to you in your after life. You will bring into full play the speech centres with their extensive connections, and acquire fluency and felicity of language, and you will emancipate yourselves from that nervous trepidation due to extraneons emotions, which is very inimical to good public speaking, and which has embittered the existence and crippled the usefulness of many public men. Cicero said "the best orators, those who speak with the greatest ease and elegance, feel some apprehension when they are preparing to speak, and are nervous during their exordium. Very often I feel myself," he went on, "become pale at the beginning of a speech, and quake with my whole mind and in every limb." Darwin suffered so much discomfort on finding himself the object of any one's attention, that only very rarely could he make up his mind to take part in any public ceremony. Huxley said to me when near the end of his days, "I suppose since I reached manhood I have had as much experience in public speaking as most men, and yet, whenever I am told now, at a meeting or dinner, that I have to talk, my tongue cleaves to the roof of my mouth." Scores of lesser men suffer purgatorial pains when called on to make the simplest statement in speech form.

Mosso, the distinguished professor of physiology at Turin, has made a special study of this subject, and has supplied us with much interesting information, both as to the *prodromata* and *sequelæ* of public speaking, not only in occasional great efforts, but in routine lecturing. His observations, indeed, have a minuteness that savours of the superfluous, for he records the temperatures and ergographic tracings of a number of learned professors before and after lecturing, with results that might have been foreseen, signs of slight excitement before lecturing and of fatigue afterwards. Perhaps I should rather say that Mosso's records reveal not slight but marked excitement before and marked fatigue after lecturing, so marked that they must surely be incidental and peculiar to the Italian temperament. Mantegazza, he tells us, after thirty years' teaching, still cannot take his breakfast when he is to give a lecture, and is often seized with nausea and vomiting on the point of its delivery. Dr. Salvioli does not sleep the night before the day on which the lecture is due, while the bladder and intestines, and a pulse of 116, betray the nervous excitement which afflicts him previous to entering the theatre, which, however, gives place to pleasurable excitement while he is actually speaking, followed again by diminished tonicity of the blood vessels, as shown by the hydrosphygmograph when the lecture is over. Dr. Patrizi has a rise of temperature from 36°·9 to 37°·8 C., and of the pulse from 78 to 136, with trembling of the hands previous to his exercitations, after which he drags his legs and requires two hours sleep to restore his energies. Dr. Maggiora, before lecturing, raising a weight of 3 kilogrammes every two seconds, makes forty-eight contractions, traced by the ergograph, equivalent to 7·161 kilogrammetres work done: but after lecturing, the force of his flexor muscles is so diminished that he makes only thirty-eight contractions, equivalent to 5·055 kilogrammetres work done. "I am acquainted," says Mosso, "with professors who have renounced the advantages of promotion to one of the large universities on account of their insuperable aversion to presenting themselves before a large assembly of students. In winter," he goes on, "one can easily tell whether some professors have lectured or not by watching them as they come from the University; in the former case their faces are flushed, they wrap their cloaks closely round them like preachers, or have a comforter wound about their necks, as they rush homewards with hasty steps."

Now I appeal to you, gentlemen, whether this sort of thing goes on in this country? Nothing of the kind! We are of sterner stuff. Have you ever seen a shame-faced professor rushing home with hasty steps, sheltering his flushed face with his cloak and a comforter after addressing his class? I trow not! For my own part, I have watched them again and again on the North Bridge, or the Mound, lolling in their carriages, or striding deliberately along with barefaced self-complacency, after a most indifferent performance. Whatever they may be at first, our men soon get case-hardened, and do not exhibit the excessive trepidation which Mosso has observed in his Latin confrères when lecturing, and also when engaged in examining. Of examination tremors, indeed, he gives a pathetic account. The examinations are, he maintains, a source of extreme fatigue to those who conduct them. The continuous attention required during the *vivâ voce* questioning, the monotony, the great responsibility, the sorrow one feels at rejecting a candidate, the apprehension of reproach and criticism, make them, he argues, a peculiarly distressing species of intellectual work. Little wonder, then, that these sensitive Italian examiners are in a sorry plight when they have gone through the ordeal. He describes their fatigue curves as indicating great exhaustion; but, strange to note, while he lavishes his sympathy on the examiners, he has not a word to say about the examinees. If the examiners are thus afflicted, what must their condition be? One would be glad to have returns as to the rate of mortality amongst them.

It is not of course possible to discuss here Mosso's views on fatigue, which are put forward with his usual ability and lucidity, but I would remark in passing—and the remark has its application to what I have to say as to the educational influence of the Royal Medical Society—that his contention that fatigue is always one and the same, whether of muscular or cerebral origin, is, it seems to me, quite untenable. Whatever the ergographic tracings may show, there are many different kinds of fatigue, and not only would I distinguish between muscular and cerebral fatigue—and surely the waste products of brain work and muscle work that circulate in the blood are different in nature and action—but I would distinguish different varieties of cerebral fatigue, resulting from different kinds of mental activity. It is quite true that there is no hole-and-corner work in the brain, no independent action of one centre. In every intellectual effort there is simultaneous activity of a large number of brain cells scattered over a wide area, but in no two intellectual efforts are the contingents of cells called into action just the same. During intellectual exertion there is constant grouping and re-grouping in combined action of different companies, battalions, and divisions of the 1600 million cells that are mobilised in the cortex, and I picture to myself the functional activity of the brain as in the intervals of ease and abandonment, shimmering over its surface from point to point like the aurora in the northern sky, as in hours of thoughtful study, gathering into a steady glow in some regions of it, and, as in moments of intense application, concentrating into an arc-light of dazzling and penetrating brightness.

But whatever the experimental investigation of fatigue may say, the common sense of it is, that it varies greatly in kind as well as in degree, and that one way of relieving it is to transfer the burden of work from one group of centres to another. As I daresay you have heard, several celebrated chess-players have died from inflammation of the brain after playing a great match, and several celebrated bicyclists have succumbed in the same way after protracted over-strain in a great race. Alike in chess-players and bicyclists, it was over-fatigue of the brain that induced the disease, but it had different starting-points in the two cases; and had the chess-players occasionally broken off their game and taken a bicycle ride, and the bicycle riders omitted a lap to have a game of chess, they might all have escaped injury. There is amongst brain workers no more familiar experience than the relief obtained by shifting the load. The strain of committing to memory is entirely different from that of observing phenomena or of working out a problem; and by alternating these we may, in the same time, get through a far greater volume of brain work than if we adhered to any one of them. You need have no fear, therefore, that in participating in the debates of this Society after your week's work, you will incur the risks of cerebral fatigue. On the contrary, you should here find a restorative change, while you are, as I have pointed out, educating your speech centres at the time when they are most educable, and getting rid of that emotional disturbance as an accompaniment of public speaking, which is really the element that makes it not only painful but exhausting, and of the melancholy effects of which amongst Italian professors, Mosso has adduced such pitiable examples.

To turn from the printed page in your rooms to the spoken word here, will be in itself an alleviation, and that brings me to what I regard as another of the educational influences of the Royal Medical Society: the assistance it gives in the assimilation of oral teaching—an influence which may become more important as time goes on. As one of the consequences of the great extension of laboratory work and practical demonstrations, there will probably come in this country—if it has not already come—gradual curtailment of lectures as a means of medical teaching.

In the United States, lectures formal and didactic in character have been reduced to quite a subordinate place. In many leading schools there, Dr. Bradford tells us, didactic lectures on such a subject as medicine are no longer given, the prevalent view being that the lecturer cannot very well bring before the student the subject-matter in a better form than that in which it is presented in the best available text-books. The abolition of lectures is indeed very general in all the subjects of medical education, and professors of anatomy may be met with who boast that they have never delivered a lecture. But this is, I think, a very regrettable state of matters. In the past, no doubt, lectures were over-done. During one session at the University here, I listened to five lectures per diem, five days a-week, with considerable cerebral fatigue; but to abandon lectures altogether will be to sacrifice what was long the sole, and must always be a valuable method of tuition. Lectures should always retain their proper place in the curriculum, for no text-book can ever be half as impressive as the living word. Even the lame lecturer has his uses; the really able one who has had his speech centres trained betimes, is an educational force of inestimable potency. I can recall now almost the *ipsissima verba* of brilliant lectures that I have heard John Hughes Bennett and Sir James Simpson deliver, in the dim and distant twilight of my student days, and I seem to see every look and gesture with which Trousseau punctuated his magnificent and instructive orations at the Hotel Dieu in Paris, 1863. The chapter of a text-book read in the study will, I am confident, have a less permanent and diffused effect than the same chapter heard from the lips of its author. It is the difference between reading a play of Shakespeare and seeing and hearing it acted. The channels of entrance to the mind are more numerous in the one case than in the other, and as regards all intellectual acquisitions the aural channel is a very important one. Impressions conveyed to the brain by the auditory nerves have a wide distribution there, only second in importance to those conveyed by the optic nerves, and the messages conveyed by the two may reinforce each other. I know of no state of mental alertness greater than that of a student who is listening to a teacher, apprehending what he says, translating it into written signs, and jotting these down in a note-book. That kind of work, highly fatiguing, was largely carried on in Edinburgh in my day, for there were several professors who had published no text-books, and whose individual views, by no means to be ignored at the examination table, were only thus to be obtained. I am conscious now of the edification I derived from listening and note-taking in the classes, and also from listening and note-taking, with a view to speech-making, in this hall. It was a most fruitful discipline. I doubt not that to-day the members feel how bracing it is to listen to a paper, with a view to its mental assimilation, and also to the speeches, examining it from various points of view, and then to focus all the knowledge thus gathered in, in an attack upon it. When the day comes that the ears are in medical education reduced to the level of rudimentary and dwindling organs like the appendix vermiformis, that is to say, when lectures are done away with, then the meetings of the Royal Medical Society will again supplement the University course, and supply an archaic, but, as I believe, essential element of sound medical education.

Still another educational influence which the Royal Medical Society may exert, and that not the least momentous, is by keeping alive some vestige of idealism amongst its members. It cannot be doubted that the present tendency of medical education is towards materialism. Attention is rivetted on material details, and if it is not lifted above them from time to time, it narrows and narrows, and becomes incapable of appreciating anything else. Materialism becomes a fixed idea or obsession beyond the reach of argument or demonstration. By the very nature of his work, the medical student is accustomed to submit everything to outward and palpable tests. He is nourished on facts, hard facts, "chiels that winna ding," as Burns describes them, which tend, as Oliver Wendell Holmes averred, to breed a despotic frame of mind in those who are wrapped up in them. He is in constant danger—unless strongly fortified by natural piety—of having his perceptions materialised, and of losing in breadth what he may gain in concentration. Science, or rather any one branch of it, when too assiduously and exclusively pursued, while it expands the mind in some directions, contracts it in others. Darwin, whose intellect was singularly keen and capacious, avows that his special studies caused the paralysis of that part of the brain on which the highest tastes depend. "Up till the age of thirty, or beyond it," he writes, "poetry such as Milton, Byron, Wordsworth, gave me great delight; but now for many years I cannot endure to read a line of poetry; I have also lost my taste for pictures and music." Herbert Spencer sacrificed his æsthetic taste and higher emotions to his devotion to material facts and theoretical considerations founded on them. He was not naturally wanting in imagination. In his boyhood he was addicted to day-dreams and building castles in the air, and his synthetic philosophy could not have been written without a liberal endowment of imaginative qualities; but it would seem that forty years of architectonic work had their effect in inducing atrophy on certain sides, for he grew indifferent to art, and his emotional nature became desiccated.

But if men of transcendent ability like these experienced some impairment of power by too exclusive devotion to one branch of study, how much more likely is it that ordinary mortals will become crippled if they confine themselves to one field of labour. Professor Oppenheim of Berlin, in his address on "Education and Neurosis," has strongly insisted on the evils of the matter-of-fact education of the day. "The acquisition of knowledge," he says, "is widely regarded as the sole aim of education." We seem to have accepted in deadly earnest Dickens' ironical exhortation in "Hard Times": "Teach these boys and girls nothing but facts. Facts alone are wanted in life. Plant nothing else, and root out everything else"; and as the result of this we see boys and girls, and men and women, for whom devotion, inspiration, enthusiasm, sympathy, susceptibility to the beauty and sublimity of nature, are unknown and incomprehensible feelings. And the absence of these feelings leaves a blank and emptiness in the mental life most dangerous to the stability of the nervous system. It was a great truth that Matthew Arnold enunciated when he said "three-fourths of life are conduct," and three-fourths of conduct are determined by emotional conditions; and he, therefore, who would make the most of life must see that his emotions are nourished and kept supple, as well as his intellect, and must not sink in practicality or book-wormishness the finer faculties with which he is endowed. There are mighty teachers for medical men beyond the medical schools. Huxley acknowledged the deep debt of gratitude he owed to Carlyle; and one of the most eminent surgeons of the day, of whom Scotland may well be proud, Sir William Macewen, said in London just three weeks ago, "The first time I read 'Sartor Resartus' it was a sealed book to me—my mind being quite unprepared for it—it fell flat. Years after, having passed through a furnace of doubt and difficulty in the meantime, I happened to light accidentally upon 'Sartor Resartus,' and opening its pages read and reread it, day and night, pursuing its discoveries with restless eagerness until it was consumed and digested. Its true meaning and bearing on life was revealed; it proved a draught of deepest joy and refreshment to a thirsty soul."

A large and varied culture is necessary for the full enjoyment and utilisation of life, a truth which is apt to be lost sight of in those days of rampant specialism, and of which even the medical student must now sometimes be reminded, for the more conscientious he is, the more apt is he to neglect everything that lies outside his professional time-tables. It would be culpable to exhort him to scatter his energies, or to have more than one great aim in life (one remembers the sorry fate of the versatile geniuses amongst one's student friends), but, at the same time, it is a duty to impress on him that he ought now and then to lift his eyes from the scalpel and the test-tube, and that, if he is to retain the rotundity of his nature and avoid lopsidedness, he must have other interests than those of a clinical description, must keep alive the family affections and the friendly glow, drink in, in moderate potations, the subtle influence of music, literature, or art, and even indulge in the daring flights of speculation and strategic manœuvres, for which the Royal Medical Society affords a favourable arena.

If the excessive use of the eyes upon very close work, especially during the growth period, from seven to fifteen years of age, may actually alter the form of the eyeball and produce a permanent defect of vision, it is surely conceivable that the excessive use of certain sets of neurons of the brain at their growth period may alter their structure and render them incapable of that range of action which they would otherwise have attained to. Professor Sherrington has shown that there is an automatic mechanism, by which the blood supply of any part of the cerebral tissue is varied in accordance with the activity of the chemical changes which underlie the functional action of that part, and we can therefore understand how important is the regulation of functional activity in relation to the development of the brain, and its ultimate capacity for mental manifestation, how desirable it is, if the brain is to reach its full measure of vigour, that all its functions should be exercised duly and timeously, none being overstrained, none left in uselessness, which ends in atrophy.

It is one kind of mental myopia to which I believe the medical student is peculiarly liable, that I have held in view in making these remarks, and that is the materialistic myopia to which I have already referred, which closes his vision to much that those exempt from it discern, much that in his unconsciousness of his own blindness he regards as hallucination. The medical student is at the age when there is a peculiar relish for anything that is *risque* or upsets authority, and a special tendency to assert freedom by revolt against old traditions. He is constantly engaged in materialistic observations and experiments, in the study of physical and chemical changes, and it is his physiological and pathological study of the brain and nervous system that, perhaps more than anything else, tends to materialise his conceptions. He sees an unvarying correspondence between mental and cerebral conditions, and, approaching these from their corporeal side, he comes to identify them and to believe that brain substance, which is as chemically definable as cheese or guttapercha, actually thinks and feels and wills. From the medical point of view it is convenient to speak of all mental modifications in terms of brain function—(and I admit that this evening I have been using the language of the grossest materialism)—and the serviceable style of expression adopted, fosters a habit of thought, and so, more and more, the medical student is disposed to accept the teachings of these leaders of revolt, who contemptuously dismiss all our most cherished beliefs and highest hopes and aspirations, and teach that there is no creative mind, no future being, no freedom of the will, and that life and consciousness are of inorganic origin.

And of those leaders of revolt at the present time there is not one who has a wider and, from my point of view, more pernicious influence than Haeckel. His great reputation as a biologist, his splendid ability, his fine literary gift, his audacity and lucidity of statement, have secured for his excursion into the field of philosophy a reception to which its own merits would not have entitled it. His "Riddle of the Universe," notwithstanding its rancorous hatred of this country, its brutal disregard of the tenderest and most sacred feelings of hundreds of millions of mankind, has been extensively read amongst us, and has, I doubt not, confirmed many medical students in their materialism. The formula used to be that the brain secretes mind as the liver secretes bile; it is now that mind is psychoplasm, a kind of protoplasm, merely differing from that of skin or muscle in the proportions of water and phosphorus it contains.

But before accepting any startling announcement of this kind, which overthrows existing beliefs, it is well to look into the scientific antecedents of him who makes it. When at the International Congress in London, Koch declared that human and bovine tuberculosis are entirely different from one another, we remembered tuberculin and doubted, and our doubts have been amply justified by the provisional finding of our Royal Commission on Tuberculosis. And so, when Haeckel propounds psychoplasm, let us remember Bathybius and doubt a little, and I am much mistaken if our doubts are not justified by subsequent inquiry. Do you remember Bathybius? He lived and died before most of you were born, so perhaps not, and I had better explain that he consisted of a soft gelatinous mud dredged from the floor of the ocean during the Challenger Expedition, which, when examined by Haeckel, was declared to be free living protoplasm, the simplest and original form of life. For a season Bathybius ruled the roost. He was baptized by Huxley "Bathybius Haecklii," and the world was assured, and, knowing no better, believed, that we had, in this amorphous sheet of protein compound, covering the depths of the sea, and constantly renewed by spontaneous generation, the promise and potency of all organic existence. Infidelity reared its head! Here was the real genesis at last! But, alas! the chemists set to work, and very soon Bathybius was exposed as an arrant impostor. Mr. Buchanan demonstrated conclusively that there was nothing organic about him, but that he consisted of an amorphous precipitate of sulphate of lime, and crystallised in the familiar form of gypsum. How are the mighty fallen! The putative father of mankind is mere mud after all!

No more was heard of Bathybius. His sponsors suddenly dropped him, and he was smashed; but he should not be forgotten, for he affords an apt illustration of the danger of the practice, only too common, of founding large and far-reaching generalisations on a very small basis of observation.

It was because Haeckel found that the jelly-like substance submitted to him had the faculty of being stained by carmine, that he unhesitatingly pronounced it organic, being ignorant of the fact that sulphate of lime precipitated from an aqueous solution containing carmine, by alcohol, is stained in exactly the same way. By one observation, therefore, afterwards proved erroneous, the whole fabric of human faith, belief, and hope was to be demolished. But anyone thus rashly generalising, however excellent an observer he may be, must be regarded with caution, not to say suspicion, when he again embarks on generalisation. Haeckel was wrong about Bathybius. Is it not just possible that he may be wrong about psychoplasm also?

It may be interesting to examine this psychoplasm a little more closely, and to form some estimate of its amount. If the air that envelopes our planet to a depth of 50 miles were liquefied, we should have an ocean of liquid air just 35 ft. deep. If the oxygen of the atmosphere were liquefied, we should have an oxygen ocean 7 ft. deep; if all the carbon existing as carbonic acid in our atmosphere were deposited as a layer of coal, it would form a world-skin just 1 mm. in thickness. All the basic material of the organic life of our planet, animal and vegetable, when you come to think of it, is in proportion to the earth's bulk; but a layer of exquisite tenuity spread over certain portions of its surface, like the blue bloom on a ripe plum, which vanishes at the slightest touch, and very awkward would it be for us, and for organic nature generally, should some cosmic Colossus take to fingering our planet. But of that film, the physical substratum of life, how much, let us ask, is concerned in the manifestation of the human mind? If we take the population of the world at this time at 1500 millions, and the average weight of the brain at 48 oz., with the specific gravity of water (its specific gravity is really 1040, but for our present purpose let us take it as water), we arrive at the startling conclusion that all the brains in the world massed together would form a cube having a side of 416 ft. But that calculation assumes that the brains of all the inhabitants of the world are of the size of the adult European brain, whereas the smaller brained races of Asia, Africa, and Australia enormously preponderate in number, and of the inhabitants of the world a majority are in a state of immaturity, in infancy or childhood, with imperfectly developed brains; or of senility with wasted brains; so we may safely reduce our brain mass by one-half, and say that it would form a cube with a side of about 288 ft. But this reduced brain mass, it must be borne in mind, would be composed of two kinds of brain substance, the active mind manifesting grey matter, and the medullary white substance, which is simply conducting material; so that in our endeavour to estimate the amount of psychoplasm we must again halve our cube, and get down to one with a side of 200 ft. But we cannot stop here, for the grey matter is made up largely of blood vessels and connective tissue, and its active constituent, the neurons or nerve cells, forms probably not more than half of its bulk, so that our cube shrinks to 139 ft. a-side, and the psychoplasm forming this block, be it remembered, is 90 per cent. water. Dry psychoplasm, therefore, is not more than the million-million-millionth part of the whole mass of the earth, so that it is much scarcer than that precious commodity called radium. It has been calculated that 2 lbs. of radium would drive a big steamer across the Atlantic. How much psychoplasm keeps the world going? Calculations such as that I have indulged in are, I admit, futile and fallacious, and I will not contend that mine is even approximately correct; but they help to bring home to us the limitations of the problems with which we are called on to deal; and as regards psychoplasm, it is obvious that it affords but a slender basis for the immensity of mind. The highly phosphorised fat of which it is composed has a weighty burden to bear.

It is this scanty psychoplasm, the highest form of living protoplasm, that, according to Haeckel, alone controls and applies mechanical power, and invents instruments suitable for realising foreseen and desired results; but psychoplasm itself is an instrument for realising foreseen and desired results, and whence can it have come, seeing that its existence must have depended upon a power which it alone possesses? In the long series of events, extending over millions of years, from the primal, eternal, indestructible, energised substance of Haeckel, the sole source and cause of all the phenomena and activities of the universe, up to the human brain, we have described by him—first, pyknotic condensation of substance; next, its differentiation into innumerable forms of ponderable matter; then the gradual synthesis of chemical molecules, until they assume the form of protoplasm; and finally, the evolution of protoplasm through vegetable and animal forms of ever-increasing complexity, culminating in the psychoplasm of the human brain. The tale he tells is, from first to last, redolent of order, law, progress, adaptation of means to ends, compelling a belief in superintending and directing mind, for which there is no room in substance filling the infinity of space in unbroken continuity. Substance must once, in its homogeneous infinity, have taken, as Burns exhorts the devil to do, "a thought to mend," and have started on its upward career, when we are not told, how or why we cannot conceive, for as yet psychoplasm and even protoplasm were not. The fact is, that Haeckel, with all his avidity and subtlety, cannot get rid of God, but merely substitutes for a Wise and Divine Creator an inane fetish of his own, which he labels "Substance." Nor is he more successful in disposing of mind, and convincing us that it is merely a mechanical function of that form of matter that he calls psychoplasm. Like Bathybius, psychoplasm is being discredited by the progress of science. It becomes more and more apparent, that although matter is the vehicle of mind, it is dominated, transcended, and moulded by it.

It is in the nerve cells or neurons forming reefs in the cortex of the brain that we have the physical basis of mind, and admirable is the work that has been done in recent years in the histological investigation of them and their connections, work highly informing and full of promise. Intensely interesting has been the process of unravelling the nervous system, of tracing out the myriad strands of which it is composed, and of observing, measuring, and classifying the myriad constellations of starry cells with which the cerebral firmament is studded. Results of inestimable value will be attained by the labours of our neurologists who, with the utmost ingenuity and patience, are teasing out for us the nervous system in all its parts, but amongst these results will assuredly not be any identification of mind with matter. We shall get to know much more of the parallelism between them and of its limits, but there is no prospect that we shall be able, with our present intellectual endowment, to throw a bridge from the one to the other, or demonstrate their approximation and unity. Mind and matter are still two distinct essences, irreconcilable in their nature, although mysteriously accordant in their operations. One kind of motion may be transformed into another kind of motion, and so may one kind of thought be transformed into another kind of thought, but under no existing conditions can a motion become a thought or a thought a motion. Nothing can be derived from motion but another motion, nothing from mental process but another mental process. The two series of phenomena stand apart and are intelligible, the one only by a psychological interpretation, the other by only a mechanical one, while every effort to fuse the two together has proved futile. A neural process and a mental process have nothing in common; the facts of consciousness are not explained by the facts of brain function; psychology is not merely a branch of mechanics, and mind can have no causal dependence on matter. Function is a physiological term, and is concerned with dynamics or things physical only, and as applied to the brain it has to do with the storage of energy and the liberation of energy or discharge of the nerve cells, and with the resistances encountered. The phenomena of consciousness are still *sui generis*, and altogether disparate from the phenomena of innervation. They occur during, not from, the activity of the highest nerve centres, and the more closely these higher nerve centres are studied the more clear does it become that they are simply sensori-motor apparatus, that the brain is a huge and highly complicated reflex machine. The most recent speculation on brain function, that of M. Jules Soury of the Sorbonne, suggests that in the case of all unconscious nervous or cerebral action there is contact between nerve endings in the brain. And that it is only when continuity is broken, and when there is a mysterious leap in the dark, from one new ending to another, that consciousness emerges.

And the mention of the reflex functions of the brain recalls to me a great medical teacher of the Edinburgh of my time, who, although not enrolled in this Society, exercised a far-reaching influence on its members, I mean the late Professor Laycock. All his former pupils with whom I have conversed, agree that they look back to his teachings, little appreciated at the time and sometimes received with derision, with ever-increasing respect. In the perspective of memory his figure has grown larger and more imposing, while the figures of other professors, who, while contemporary seemed much bigger than he, have dwindled considerably. Well, it was Laycock who first suggested and maintained the sensori-motor constitution of the cerebral hemispheres. This view was opposed by Marshall Hall, on the ground that Flourens, mechanically irritating the cerebro-spinal axis from above downwards, obtained no motor response until the corpora quadrigemina were reached, from which point to the cauda equina muscular contraction could be elicited by mechanical stimulation. The corpora quadrigemina were therefore regarded as the high-level point of reflex action. But Laycock, with great acuteness and curious foresight, argued that as different nerves have their proper endowments, and can only be made functionally active by appropriate stimuli—the optic nerve by light, the olfactory by odours—so it is probable that the grey matter of the cerebrum has its special functional limitations, and can only be brought into play by stimuli much subtler and nearer to the undulations of an elastic medium than cutting, pricking, and tearing. The irritant, he said, to call forth its reflex activity must be something more closely assimilated to the normal excitation, thus anticipating by thirty years the discoveries of Fritch, and Hitzig, and Ferrier, as to the electrical stimulability of the cortex. Founding on the phenomena of poison circulating in the blood and acting on the brain—narcotics and strychnine, and the poison of hydrophobia—and on the symptoms of various functional derangements of the encephalon, he succeeded in establishing what he called the excito-motor function of the brain, and showed that, like a segment of the cord, it responds by movement to outward impressions. He argued convincingly that the cerebral nerves are incident excitor-nerves, that impressions made on them are conveyed to the central axis, and induce changes in that portion of the cerebral cortex that is analagous to the posterior horns of the spinal cord, changes which impinge on the motor area of the brain, and there set up motor impulses which, carried off by the motor nerves, give rise to combined muscular acts or irregular and spasmodic movements. He argued further, that similar acts and movements may have a centric origin, that is to say, that the exciting cause may be within the brain, just as the cause of acknowledged reflex acts may be within the spinal cord. With rare prescience he foresaw that it would be proved that the sensory centres are posterior in the brain, and the motor centres in the Rolandic area.

And yet—and the fact is a somewhat melancholy illustration of the shortness of the scientific memory in these bustling days—notwithstanding the significant and fruitful work he did, Laycock is almost forgotten. A pioneer in neurology, his name is unknown to many of those who have been able to push on through the clearances he made. A brilliant psychologist, he is ignored by the modern investigators of mental function. In the text-books he is not quoted, and, strangest of all, in Myers' big book on "Human Personality"—two volumes of 700 pages each—there is not the remotest reference to his theory of unconscious cerebration, the true key to that sub-limnal consciousness of which we hear so much in this work.

I am in hopes that Laycock will be re-discovered one of these days, that some of his scattered papers will be collected, and that we shall have new editions of his "Mind and Brain," and of portions of "Nervous Diseases of Women," and "Clinical Observation and Research," for his writings are still highly suggestive. They contain, besides some fanciful speculation, many astute observations and pregnant hints, much sound wisdom, and no crude materialism.

I have said that the study of the physiology and pathology of the brain and nervous system tends to encourage materialistic notions. Perhaps I should have said that it is their superficial study that does this, for many of those who have investigated these subjects most profoundly have repudiated materialistic interpretations. Hughlings Jackson, the great neurologist of our time, has emphatically expressed his adherence to the doctrine of psycho-physical parallelism, and does not define the powers of mind in terms of brute force. Herbert Spencer says, "It is impossible either to interpret matter in terms of spirit, or spirit in terms of matter. The problem is to the human intelligence insoluble." Marshall Hall saw in every physiological act of the reflex excito-motor power an evidence of design, the object of all such acts being the conservation of the individual and race; and Laycock was a teleologist also, and taught that ideas are causes not only of life and thought, but of all the phenomena of creation. Let me quote from him one remarkable passage, written long before Darwin had spoken:—

"The transition of structure and function is gradual, and consequently no strong line of demarcation can be drawn between the manifestations of the various functions of the cerebro-spinal axis. The automatic acts pass insensibly into the reflex, the reflex into the instinctive, the instinctive are quasi-emotional, the emotional are intellectual. This gradation of structure and function, observed in the nervous system, is observed also with reference to all other structures of the body. Man is at the head of a vast ascending scale of life, so extended in its connection downwards, that for the present purpose it may be regarded as infinitely extended. With our existing knowledge of the uniformity of the laws of creation, the deduction is absolutely incontrovertible, that the scale of being is not truncated at man, and that beyond him there cannot be a dark, unpeopled void. The law of gradation of development, vigorously pushed to its legitimate conclusion, points out an infinite gradation of beings *above* and *superior* to man. That we cannot see such beings, or demonstrate their existence, is a necessary result of our position in the scale, and no proof whatever of their non-existence. The worm knows nothing of man, his works, or his actions; nothing of the sun or stars, or of the beings swarming around it; and so with reference to the spiritual world—the world around and above us; our organs may be, and doubtless are, as imperfect as those of the worm with reference to the world around and above it. Man is then at the foot of another scale of being, the highest of which, at least, as far transcends man as man transcends the zoophyte. This proposition, I repeat, is the unavoidable inference from our present physiological knowledge, and it is a complete answer to those good, zealous, but not wise men, who think science leads to scepticism and irreligion. It leads to a rational faith, utterly opposed to arrogant infidelity."

A fortnight ago, Sir Oliver Lodge, the Principal of the University of Birmingham, was enunciating very much the same views which Laycock set forth fifty years ago. "At what stage self-consciousness began," he said, "it was difficult to discover, but the oneness of man with nature was not to be deplored, but rather rejoiced at, when properly conceived. The universe is not limited to human conceptions; it had a reality apart, but they themselves were constituent parts of it, and were consistent only in so far as they corresponded with something real. What man could clearly perceive was already existent, and in that they had a dim fore-shadowing of a higher reality."

To us as medical men a belief in the higher reality should be a sustaining thought amidst all the suffering, mutilation, sorrow and death through which our path must lead us. "Things are not what they seem." This is a world of small cognition but of mighty inference, and to the thoughtful the inference may dominate the cognition, for there are those to whom the things of faith are more real than those of sense. Materialism is a sorry creed, negatived by those universal and inextinguishable human affections that will not be buried in the grave, and that, to the teleologist at any rate, must have a motive and objective. Doubt is needful as a stage in the mind's progress, but it is no abiding place; and in scepticism there is no rest, for most sceptics are harassed by doubts of their own scepticism. Let us contemplate the brain, then, not as a mere collection of atoms or mass of phosphorised fat, but as a psycho-active body, from which, as long as life lasts, a stream of emanations issues, infinitely more mysterious than those of radium. There is the neuron, and behind it the psychon, and we must regard man not merely as a material object amongst other material objects, but as "a reasonable soul and human flesh subsisting." By taking this view of his nature shall we best minister to his necessities when he seeks our aid. Man is our study—man in his two-fold nature, in his history and destiny, the central interest of the cosmos for "the condensation of nebulæ into suns and planets, and the breaking up of worlds, are only barren scenic effects," unless they are in some way linked with his sentient being, and the æons of eternity past and to come are meaningless if they have no relation to his seven ages, and to the glory that shall be revealed to him hereafter.

ACUTE MYELOCYTIC LEUKÆMIA.

By William Elder, M.D., F.R.C.P.Ed., *Physician, Leith Hospital;* and J. S. Fowler, M.D., F.R.C.P.Ed., *Extra Physician, Royal Hospital for Sick Children, Edinburgh.*

(Plate VI.)

On account of the rarity of the condition, as opposed to the comparative frequency of acute lymphatic leukæmia, it is desirable that every case of acute myelocytic leukæmia should be put on record, and for that reason the following one, which was under our care some years ago, seems worthy of publication.

The patient was a man, æt. 34, a labourer, who was admitted to Leith Hospital on 12th December 1901, complaining of weakness, giddiness, and pains all over the body, but especially in the back, of a week's duration. When the patient was seen in the out-patient department, nothing could be discovered to account for his weakness, but as the pulse was 136, small, feeble, and irregular, it was considered advisable to admit him to hospital for observation.

Family History.—Good. His mother died at the age of 25, the cause of death being unknown.

Previous History.—Social surroundings poor. The patient is a heavy smoker, intemperate, but has not had syphilis. Except for an attack of typhoid fever ten years ago, he has always been healthy.

Present Illness.—The patient was doing the ordinary work of a navvy, and felt absolutely well until a week ago, when he began to suffer from pains in the legs, back, and arms. Since the pain began he has felt weak and easily exhausted, and has suffered from breathlessness and giddiness. There has never been any swelling of the joints, there have been no gastro-intestinal symptoms whatever, and no hæmorrhages have occurred.

State on Admission.—The patient is a well-developed, well-nourished, muscular man; his complexion is florid, with slight pallor of the lips and conjunctivæ. He is not jaundiced, and there are no cutaneous eruptions. There are no glandular enlargements, nor is there any tenderness over the bones. The pulse is 92, slightly irregular.

Alimentary system.—The tongue is clean. The teeth are carious, and there is slight ulcerative stomatitis, but apart from this, which consists merely in a superficial necrosis of the edges of the gums, where they come in contact with the decayed teeth, no other ulceration is present about the mouth. The pharynx and tonsils are normal; there are no dyspeptic symptoms, and the bowels have been regular up till the present. The liver dulness extends from the sixth rib to the costal margin. The lower border of the stomach is in its normal position. The abdomen is flaccid; the spleen is not palpable, though the area of splenic dulness is, if anything, a little enlarged.

Circulatory system.—The apex beat is so feeble that it cannot be felt. The cardiac dulness is of normal size. The heart-sounds, though faint and almost inaudible, are pure and free from bruits.

The *respiratory system* is normal. The urine is pale, acid, sp. gr. 1034, and deposits urates, but contains no albumin, blood, or casts. Except for headache, the *nervous system* is normal.

PROGRESS.—*December* 12.—About ten hours after admission the patient passed a copious fluid motion, consisting almost wholly of dark-coloured altered blood. Evening temperature, 100°·6. *December* 13.—Two more stools containing blood. A probable diagnosis of duodenal ulcer was made, the rapid pulse and debility being ascribed to unnoticed hæmorrhages from the bowel. *December* 20.—No more hæmorrhage has taken place, but the patient is weaker and looks ill. He complains of pain in the right hypochondrium. Temperature, 100°·8. *December* 26.—For the past few days the temperature has ranged between 99°·6 and 101°·4, and the pallor, irregular, rapid pulse (88 to 104), and prostration continue. A *blood count* was made, giving—Red corpuscles, 3,132,000; hæmoglobin (Gowers), 48 per cent.; leucocytes, 7210 (the microscopic appearances will be referred to later). The urine contains a trace of albumin, and deposits triple and stellar phosphates. *December* 29.—Severe headache. Pulse, 106, irregular. *December* 30.—Headache continues. Temperature, 102°·2. *December* 31.—At 5 A.M., free epistaxis for an hour, which completely relieved headache. Temperature, 100°·2. Pulse weaker, 120. *January* 2, 1902.—Another attack of epistaxis; except for headache the patient complains of no discomfort, but is weaker. Pulse, 120, irregular. *Blood*—Red corpuscles, 3,200,000; hæmoglobin, 38 per cent.; leucocytes, 5800. *January* 6.—Temperature still ranging about 101°. Pulse quicker. *Blood*—Red corpuscles, 2,416,000; hæmoglobin, 36 per cent.; leucocytes, 12,190. *January* 9.—Patient is acquiring a somewhat yellow tinge, suggestive of pernicious anæmia. He complains greatly of epigastric pain. *January* 10.—*Blood*—Red corpuscles, 2,400,000; hæmoglobin, 36 per cent.; leucocytes, 20,000. *January* 11.—Death took place unexpectedly in the early morning.

POST-MORTEM REPORT (Dr. T. Shennan).—Surface of body pale, no lividity. Peritoneal cavity contained a small quantity of clear, blood-stained fluid. Both pleural cavities contained 10 oz. of more markedly blood-stained fluid. The pericardial sac was completely obliterated by adhesions. Right heart empty; left contained very little blood. Valves healthy; heart muscle pale. The lungs were normal in appearance. The spleen measured 17 × 12 × 4 cms., and was dark bluish-red in colour. Its surface was smooth except for a small area, over which there were firm adhesions. The organ was soft to the touch, and on section a good deal of the pulp could be scraped away with the knife. The suprarenals were normal. The left kidney measured 11½ cms. The capsule stripped readily; the surface was pale yellowish-pink. The cortex was broader than normal. The right kidney measured 12 cms., and was in the same condition as the left, except that there were a few melon-seed-sized firm white nodules at the junction of the cortex and medulla. Gall bladder empty. Liver measured 9½ cms. transverely by 6½ cms. vertically; its surface was smooth and pale. The pancreas was normal in appearance. The stomach was very much distended, and filled with about a quart of dark clotted blood. To this hæmorrhage the sudden death had been due. The gastric mucous membrane was of normal thickness, and showed the cicatrix of an old ulcer just below the cardiac orifice. The source of the fatal hæmorrhage could not be detected. The mesenteric glands were not enlarged. A considerable amount of blood was mingled with the contents of the intestine. The mucous membrane of the greater part of the ileum was covered by dark-red mucus, but no ulcers were present. The Peyer's patches were not unduly prominent, but the solitary glands of the small intestine were very distinctly swollen. The thymus was visibly present. The axillary, cervical, and mediastinal glands were not enlarged, but the last mentioned showed anthracosis. The bone marrow throughout the shaft of the left humerus was of a uniform deep-red colour.

Parts of the liver, spleen, kidneys, marrow, and blood from the heart were removed for microscopic examination.

If we shortly review the clinical features of this case, we find a previously healthy man, in whom general asthenia developed comparatively suddenly, without apparent cause. The most prominent early symptom was the enfeebled and rapid cardiac action; anæmia was at first to a great extent masked by the naturally ruddy complexion, so much so, that, unfortunately, an examination of the blood was not made during the first ten days or so. A trifling erosion of the gums, hæmorrhages from the stomach, bowel, and nose, associated with a slight degree of fever and progressive weakness, complete the picture. The total duration of the illness was less than six weeks. The original diagnosis of duodenal ulcer was departed from, and a correct one made as soon as the blood was examined, when the following state of matters was found:—

Differential Count in Triacid Stained Films.

Date.	Total Leucocytes.	Lymphocytes.	Polynuclears.	Eosinophiles.	Myelocytes.	Nucleated Reds per 500 Leucocytes.
December 26, 1901	7,210	29	46	4	21	101
January 2, 1902	5,800	28	56·8	2·2	13	100
January 6, 1902	12,190	28·6	54	3·2	13·2	177
January 10, 1902	20,000	29·2	55	2·8	13	780

There was some poikilocytosis but no polychromatophilia. A good many megalocytes were present. Nucleated reds were very abundant, especially in the later films; all were normoblasts, many with double or irregularly shaped nuclei. A fair number of the polynuclear leucocytes have no granules. In addition to typical myelocytes with neutrophile and eosinophile granules, there were a good many cells of the myelocyte type, but with nuclei which, instead of being round, were slightly indented. In films taken on 6th January, and subsequently stained with Michaelis' eosin-acetone-methylene-blue mixture we found: small lymphocytes, 23·2 per cent.; large lymphocytes, 10·6 per cent.; polynuclears, 47 per cent.; myelocytes, 11 per cent.; eosinophiles, 5·6 per cent.; mast cells, 2·6 per cent. Many forms intermediate between large mononuclears ("lymphoid cells"), typical large lymphocytes, and sparsely granular myelocytes, were present. The basophile cells were both mono- and polynuclear. A considerable number of vacuolated reds and a degree of polychromasia were present.

Microscopic Examination of the organs brought out the following appearances:—

Liver.—The outlines of the portal spaces are indistinct. Except for a slight degree of cloudy swelling and a somewhat excessive number of leucocytes in the capillaries, the organ shows no changes.

Spleen.—The capsule of the organ is normal. The Malpighian bodies have indistinct outlines, fading gradually into the surrounding pulp. The pulp is increased in amount, and the Malpighian bodies are in consequence much more widely separated than normal. The most striking feature in the pulp is the great number of eosinophile leucocytes scattered through its sinuses, from fifteen to twenty of these cells being seen in almost every field of a $\frac{1}{12}$ in. lens. The sinuses contain more red blood corpuscles than usual, but nucleated reds are relatively infrequent as compared with the number present in the general circulation. A considerable number of large mononuclear cells (myelocytes) are also present, and form a prominent feature in the section. No giant cells of the marrow are seen. No eosinophiles are found in the Malpighian bodies, but a fair number of myelocytes are present.

Kidneys.—There is a slight increase in the interstitial tissue, and many of the tubules show signs of desquamation. The glomeruli are healthy.

Marrow sections.—The principal characteristic of the sections is the occurrence of many large clumps of myelocytes, mostly lying in close relation to the vessels. Among these myelocytes many eosinophiles are present, though not in such numbers as in the spleen. Numerous normo- and megaloblasts are also seen. On the whole, the myeloid character of the marrow is increased, the lymphocytic elements being relatively fewer than normal. Giant cells of the marrow are normal in appearance, but somewhat few in number.

Films made from marrow showed an increased proportion of myelocytes as compared with other cells (Plate VI., Fig. 1).

Blood from ventricles.—This showed the same qualitative changes as the blood of the capillaries during life, but to a much greater degree, the number of leucocytes being undoubtedly very much larger, and the myelocytes more numerous, giving the appearance of ordinary fairly severe myelocytic leukæmia (Plate VI., Fig. 2). An accurate differential count could not, however, be made, owing to the fact that, as is usual in blood films made post-mortem, many of the cells did not stain satisfactorily. The main feature—a great excess of myelocytes—was, however, a striking characteristic of the films.

Sections of liver, spleen, and kidney were also treated with potassium ferrocyanide and hydrochloric acid, but, except for a few sparsely scattered granules in the tubules of the kidney, they gave no evidence of iron reaction.

The diagnosis in this case seems unquestionable. The presence of so large a proportion of myelocytes as 13 per cent., especially when associated with the great number of erythroblasts, even in the absence of any marked leucocytosis, points conclusively to the case being one of myelocytic leukæmia, whilst the short course with the hæmorrhagic symptoms conforms exactly to the type of acute leukæmia. In addition to the clinical evidence, the pathological changes, essentially consisting as they do in a proliferation of the myelocytes of the bone marrow and a not inconsiderable myelocytic infiltration of the spleen, assure the diagnosis. The significance of the eosinophilia in the spleen is unknown; one of us has reported its occurrence in the splenic anæmia of infants. (9)

The subject of this paper has been recently discussed by Billings and Capps (6) in America, and Hirschfeld (7) in Germany, and, except by way of confirmation of their conclusions, our case does not throw any new light on the symptomatology of the condition. It agrees with the description given by these writers in showing—(1) Greater anæmia than is usual in chronic leukæmia, and (2) the presence of a considerable number of myelocytes. We would especially note, also, the presence of cells intermediate between lymphocytes and myelocytes, as in Billings and Capps' and other cases, polynuclears without granules, as in Hirschfeld and Alexander's case, a larger proportion of eosinophiles and mast cells than seems hitherto to have been observed, and, in particular, a very low leucocyte count, not rising above normal until the very end, and then only reaching 20,000.

This is, we believe, the first case which has been reported in England, and as the previous papers are so few in number we may be allowed shortly to summarise them. In the two articles referred to twelve cases are quoted, and we have not found any others in the literature, although doubtless some exist described under names other than acute myelocytic leukæmia, and hence may have escaped our notice. As is not unnatural, several of the cases quoted as probable instances of this disease are atypical in many respects, and we think that only the following come definitely into the group we are now discussing:—

CASE 2. (Thomson and Ewing (1)).—Female, æt. 21. Onset with sore throat, painful swelling of right arm, vomiting, and fever; no hæmorrhages. Duration, two months.

Blood.—Red corpuscles, 1,290,000; hæmoglobin, 20; leucocytosis, of from 50,000 to 100,000. Normoblasts very numerous. Differential count—lymphocytes, 33 per cent.; polynuclears, 55 per cent.; myelocytes, 12 per cent.; eosinophiles few; mast cells absent.

Case 3. (Leube and Arneth (2)).—Male, æt. 10. Onset with epistaxis, anæmia, moderate enlargement of the liver and spleen, and great tenderness over the bones. Duration, eighteen days.

Blood.—Red corpuscles, 256,000; hæmoglobin, 10; leucocytes, 10,600. Great alterations in red corpuscles—poikilocytosis, normo- and megaloblasts, with double or irregular nuclei. Differential count—small lymphocytes, 22·9 per cent.; large lymphocytes, 8·2 per cent.; polynuclears, 53 per cent.; eosinophiles, 0·3 per cent.; myelocytes, 15·1 per cent.; eosinophile myelocytes, 0·5 per cent. Many non-granular and sparsely granular polynuclear cells were present, and in addition to neutrophile myelocytes there were numerous cells like myelocytes but with few or no granules. The bulk of the cells in the marrow resembled myelocytes but were non-granular; Arneth suggests that they were Türk's *Reizungs-formen.*

Case 4. (Ewing, quoted by Billings and Capps (3)).—Male. Anæmia, with slight enlargement of spleen and glands. Very rapid course.

Blood.—Red corpuscles, 1,080,000; hæmoglobin, 20; leucocytes, (from axillary vein post-mortem), 31,000. Differential count—lymphocytes, 61 per cent.; polynuclears, 6 per cent.; myelocytes, 31 per cent.; eosinophile myelocytes, 2 per cent. A few mast cells, numerous normoblasts. Films from the marrow showed chiefly myelocytes, from the glands a uniform growth of large non-granular mononuclear cells, and from the spleen many small lymphocytes.

Case 5. (Grawitz, quoted by Hirschfeld (4)).—Female, æt. 42. Onset with bleeding from gums, on account of which fourteen teeth were extracted. Stomatitis and necrosis of the jaw. Enlargement of the cervical glands and spleen; general hæmorrhagic diathesis. Duration, fourteen days.

Blood.—Leucocytes, 190,000. Differential count—small lymphocytes, 5 per cent.; large lymphocytes, 15 per cent.; polynuclears, 10 per cent.; myelocytes, 60 per cent.; eosinophile myelocytes, 10 per cent.; no mast cells.

Case 6. (Hirschfeld and Alexander (5)).—Male, æt. 21. Onset with ulcer of lip, periostitis of jaw and metatarsus, anæmia, gingivitis, and progressive asthenia; spleen palpable. Duration, two months. During the earlier stages of the malady there was simple anæmia, without qualitative changes in the blood; during the latter half leukæmia developed.

Blood.—Red corpuscles, 1,250,000; hæmoglobin, 15; leucocytes, 30,800 to 64,000. Differential count—small lymphocytes, 7·4 per cent.; large lymphocytes, 19·2 per cent.; polynuclears, 64·7 per cent.; myelocytes, 8·6 per cent. Mast cells and eosinophiles were absent; a number of the polynuclear leucocytes had no granules. Post-mortem, the marrow was densely infiltrated with myelocytes, there being few polynuclears and eosinophiles, and no mast cells. The pulp of glands and spleen showed myeloid changes, and consisted almost entirely of myelocytes and giant cells of the marrow—films could, indeed, scarcely be distinguished from those made from the marrow itself.

CASE 7. (Billings and Capps (6)).—Male, æt. 68. Onset with ulceration at the root of a carious tooth, followed by necrosis of the jaw. Progressive anæmia, gingivitis, cutaneous hæmorrhages, slight enlargement of the cervical glands and spleen, albuminuria and casts. Duration, two months.

Blood.—Red corpuscles, 1,700,000; hæmoglobin, 30; leucocytes, 374,000. Many normoblasts. Differential count—small lymphocytes, 1·6 per cent.; large lymphocytes, 22 per cent.; polynuclears, 21·2 per cent.; eosinophiles, ·4 per cent.; myelocytes, 54·4 per cent.; mast cells, ·4 per cent.; no sectio.

Apart from these six cases, which one cannot avoid regarding as definite examples of acute myelocytic leukæmia, we have found none in the literature free from doubt. Türk's case (10), though of great interest, has too much resemblance to the allied disease chloroma to permit us, in the present state of our knowledge, to place it in the same group as the preceding. The patient was a man of 38, who died after three or four months' illness, in which the symptoms were very like those described above. His blood showed 560,000 red corpuscles, 10 per cent. of hæmoglobin, and 58,000 leucocytes, of which lymphocytes formed 18 per cent., polynuclears 37 per cent., and myelocytes 40·5 per cent. Eosinophiles were few; mast cells entirely, and normoblasts almost entirely absent. Post-mortem, the marrow of the ribs, vertebræ, sternum, and femora was bright green in colour; similar green foci were present in the kidneys, and there were large deposits of the same material along the periosteum of the vertebral column. The lesions were highly suggestive of chloroma, the only point of difference being that they were composed wholly of myelocytes, not lymphocytes. This case seems to us to stand almost alone, and is remarkable as suggesting a condition intermediate between myelocytic leukæmia and chloroma, analogous therefore to the cases which Bramwell (8) has recorded as intermediate between that rare disease and lymphatic leukæmia.

So far as the rather scanty data go, the following are the main conclusions to be drawn:—

1. The course and clinical features of acute myelocytic leukæmia are practically identical with those of the much more common acute lymphocytic leukæmia.

2. The anæmia is generally greater than the ordinary chronic cases. Case 3, in which the anæmia was profound, has, along with others, been described by Leube under the title of "leukanæmia," on account of the extreme qualitative and quantitative

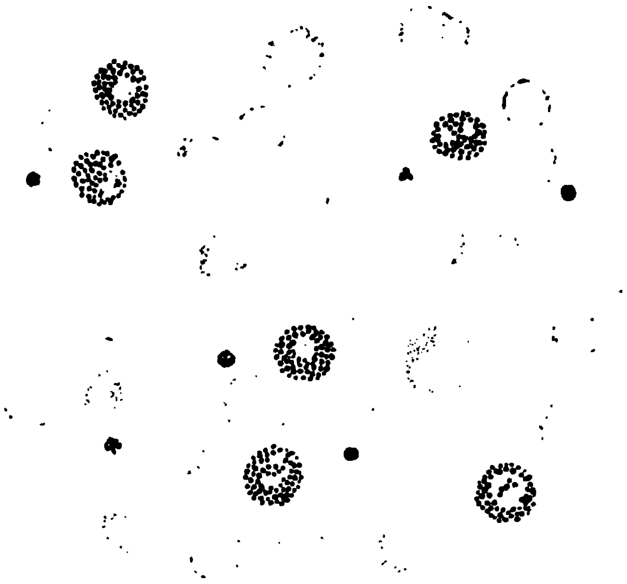
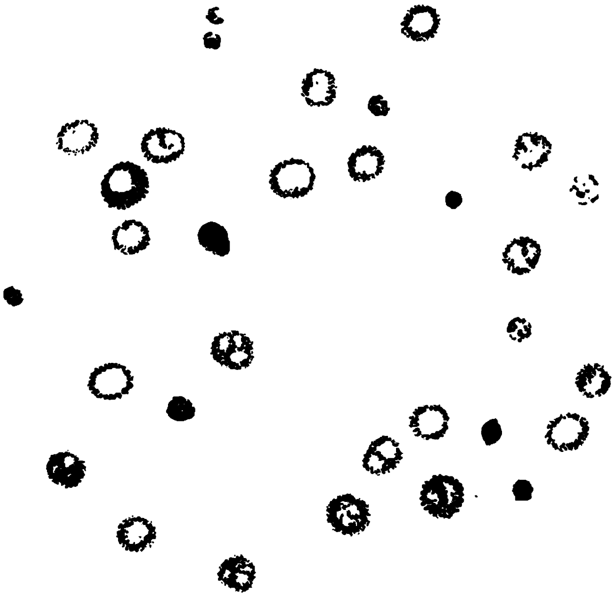


Fig. 1.—Scraping from marrow. Triacid stain × 600.



alterations in the red cells. We agree with Hirschfeld, however, in looking on it as acute myelocytic leukæmia.

3. The leucocyte count is not always high; it may be little above normal, but sometimes rises to a figure comparable to what is got in chronic cases.

4. Eosinophiles may be absent or few; the same is to an even greater extent true of mast cells. As in other cases of a typical leukæmia, many of the leucocytes are difficult to classify, and forms morphologically intermediate between large lymphocytes and myelocytes are common. Non-granular polynuclears are also found. Normoblasts may be absent or plentiful, and megaloblasts are sometimes present.

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THE PROGNOSIS OF EPILEPSY.[1]

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Although the study of epilepsy in general, dates from a period far back in classical times, detailed attention to the prognosis of the disease was not made a subject of special study until the appearance of Herpin's well-known work.[2] This writer's conclusions and the statements regarding his cures were so bright, and so much at variance with what had previously been accepted, that attention was again called to the possibility of cure in many cases of epilepsy.

A few statistics on this subject may therefore be given, with a view to show the variability existing between the results of treat-

[1] A paper read before the National Association for the Study of Epilepsy, at Boston, U.S.A., November 1904.

[2] "Du Pronostic et du traitement de l'epilepsie," Paris, 1852.

ment obtained at different periods. Before the introduction of the bromides, it is interesting to recall the high percentage of so-called cures which have been recorded:—

Hufeland	gave 5 per cent. of cures.
Russell Reynolds . . .	„ 10 „ „
Trousseau	„ 13 „ „
Herpin	„ 50 „ „

The almost universal administration of the bromides since their introduction in 1857, in the treatment of epilepsy, has in no way affected the variability in the results. To mention only a few instances:—

Nothnagel . . .	gives 4 to 5 per cent. of cures.
Spratling	„ 5 „ „
Lähr	„ 6 „ „
Ackermann	„ 7·6 „ „
Dana	„ 5 to 10 „ „
Wildermuth . . .	„ 8·5 „ „
Habermaas	„ 10·3 „ „
Alt	„ 12·5 „ „

It must be evident that some explanation ought to be forthcoming as to the difference existing between the statistics of authors upon the results obtained before and since the introduction of the bromide treatment. First, some proportion of the existing difference is accounted for by the greater precision exercised in diagnosis, the later authors excluding from their statistics all cases of epilepsy due to organic disease. Secondly, much of the discrepancy existing in statistics depends upon the definition of "cure"—the interpretation differing widely. Most authors fail to state in their writings what is their definition of "cure" or recovery from epilepsy, and in the majority of instances so-called cures are merely long remissions occurring spontaneously, or as the result of suitable treatment.

The cases upon which the following observations are based have been obtained from the records of the National Hospital for the Paralysed and Epileptic, Queen Square, London, and from the cases under care and treatment at the Colony for Epileptics, Chalfont St. Peter, Buckinghamshire. Of the former 365, and of the latter 161, were available for statistical purposes. In analysing the cases, certain guiding principles were laid down, and the following eliminations were made: all cases which showed any coexisting complication, such as organic cerebral disease, and all cases of idiocy and pronounced imbecility. By observing these restrictions, cases of so-called idiopathic epilepsy were, as far as possible, obtained; while any transitory amelioration resulting from medicinal or other treatment was checked by fixing the minimum period of observation at two years.

It is not proposed in this communication to detail the figures and percentages which have been already published,[1] but merely to enumerate herein the general results which were in this way obtained.

The prognosis of epilepsy, and the conditions which influence it, will he mentioned under the following headings:—

(1) The influence of sex; (2) of an hereditary disposition; (3) of age at the onset of the disease; (4) of the duration of the disease; (5) of the frequency of the seizures; (6) of the character and time of the seizures.

1. *The influence of sex.*—Sex plays little part in the general prognosis of epilepsy. Rather more males than females show arrest of the seizures, but at the same time the former sex gives a greater percentage of confirmed cases. As regards the influence of sex upon the mental condition in epilepsy, it would appear as if a larger percentage of women escape the deteriorating influence of epilepsy upon the mind than men, but that when dementia supervenes and reaches its most pronounced form, a somewhat higher percentage of women are affected. The most frequent mental condition in male epileptics would seem to be a slight impairment of the memory and the blunting of the higher mental faculties.

2. *The influence of hereditary disposition.*—The only hereditary maladies taken into consideration in this investigation are epilepsy and insanity. It would appear from the investigation that the following general conclusions may be drawn: (*a*) That there is as great a chance of arrest of epileptic fits in those who have as in those who have not a known family history of epilepsy. (*b*) In those who have an hereditary history the chances as to whether the fits become arrested, improved, or confirmed, are in any given case about equal. (*c*) That as regards general improvement more is to be expected in those who have no hereditary disposition, while a considerably smaller percentage of confirmed epileptics is to be found amongst those who have no family predisposition to the disease. As regards the influence of an hereditary disposition upon the mental characteristics, the fact may be stated, that a family disposition to epilepsy or insanity exerts to a great extent a deteriorating influence upon the mental condition of those who subsequently develop epileptic seizures. So that a general statement may be made that a family tendency to either epilepsy or insanity, though offering no obstacle to the arrest of the seizures in favourable cases, materially increases the likelihood of the disease becoming confirmed, and the supervention of dementia.

3. *The influence of age at the onset of the disease.*—The main

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[1] *Transactions of the Royal Medical and Chirurgical Society of London*, vol. xxxvi. and lxxxvii.

conclusions to be derived from a study of the statistics, with special reference to this point, may be stated as follows: (*a*) That epilepsy commencing under 10 years of age is least favourable for arrest or improvement, and most favourable for the production of confirmed cases. In a similar way a low percentage of mentally healthy individuals is to be found amongst those in whom the disease commences in early childhood. This class also contains a high percentage of cases showing profound mental impairment. (*b*) Amongst those in whom the disease commences during the period of puberty, is to be found the greatest percentage of arrests, and the lowest percentage of confirmed cases, in which class also is observed a greater percentage of cases showing slight mental deterioration, and a smaller percentage showing mental deficiency.

The cases of epilepsy which commenced between the 21st year of age and the age of 35, showed a steady diminution in the percentage of arrests, and a progressive increase in the percentage of confirmed cases. But after the latter age there is again a diminution in the number of confirmed cases; while senile epilepsy is essentially a tractable disorder.

From the above, the following general statement may therefore be made: Epilepsy commencing in infancy and childhood is the least favourable for arrest of the fits, and the most favourable for the production of the confirmed disease. The common type of epilepsy, or that commencing during puberty, is the most favourable form of epilepsy, both as regards the arrest of the seizures and the absence of mental infirmity. Adult epilepsy is unfavourable; but senile epilepsy is tractable.

4. *The duration of the disease.*—Speaking in general terms, the earlier a case is brought under systematic treatment, the more hopeful the prognosis and the greater the probability of improvement. There is a greater prospect of arrest or improvement during the first five than during the second five years of the disease. Under five years' duration there is a considerably greater percentage of cases with no mental impairment, or merely slight interference with the memory, than of those with well-marked mental deficiency. Arrest of the fits may take place in cases even after a duration of from twenty to thirty years, although on the whole there is a progressive tendency for epilepsy to become confirmed the longer the disease lasts without definite treatment. Although the duration of epilepsy from the commencement of the seizures is a potent factor in determining the subsequent mental condition, it should be pointed out that in a few cases the disease may have lasted for periods of thirty or more years without the development of any obvious mental impairment.

5. *The frequency of the seizures.*—As regards general prognosis, it may be stated that the longer the interval between the attacks, the greater the prospect of arrest or improvement. Very infre-

quent attacks are eminently favourable; attacks which occur every three or four months, or once or twice a year, are, within certain limits, of more satisfactory prognostic importance than those which may be counted by the month, the week, or the day. The greatest percentage of confirmed cases, and the smallest percentage of arrested cases, are found to occur in those epileptics who are subject to daily and weekly attacks. As regards the influence of the frequency of the seizures upon the mental condition, the general statement may be made that there is a direct relationship between the frequency of the seizures and the degree of mental impairment. The more frequent the attacks, the more common and profound the associated dementia. Nothing more forcibly illustrates the severity of the disease than the frequency of the attacks. For, in addition to the close association between the frequency of the seizures and mental deterioration, there is a remarkable relation between frequency and arrest of the fits. Attacks which recur every three or four months, or once or twice a year, show the highest percentage of arrested, and the lowest percentage of confirmed cases, as well as no cases of mental debility; while the attacks which recur so often as several times a day, show no cases of arrest, and no cases of mental integrity.

6. *Character of the seizures.*—The kind of attack to some extent modifies the prognosis. It is a matter of common knowledge that the major attacks are more readily influenced by drugs than the minor seizures. It was clear from the statistics that the greatest percentage of arrests was found in cases of the *grand mal.* Then followed the cases of the combined *grand* and *petit mal,* while the least favourable were the cases of the *petit mal* occurring alone. As regards the mental condition, it was noted that mental deterioration was found in association with both types of seizure, but its presence was less frequent in those cases in which the *grand mal* was the main expression of the disease. Freedom from mental impairment was also found in both types, but to a minimal extent in those cases characterised by the *petit mal,* whether alone or in conjunction with the *grand mal.*

The mind was more frequently affected to a slight extent in those cases in which the *petit mal* seizures occurred alone; and lastly, the mind attained its most universal and profound impairment when the disease was manifested by a combination of the *grand* and *petit mal* attacks.

LONG REMISSIONS IN EPILEPSY.—It is well known that remissions are a frequent, if not a characteristic feature of this disease. The common remission, which takes place during childhood, in those whose fits commence in infancy, then cease for a time, and recur at or about the time of puberty, is one of the most remarkable features of the disorder. An interval of several years not infrequently occurs between the first and second attacks, while numerous instances may be cited in which periods of five, ten, or fifteen years have been known to elapse between epileptic seizures. Wharton Sinkler records a remission of twenty-nine years in one of his cases. The present series of cases revealed a number of instances in which remissions were observed, and which persisted for several years, but were succeeded by a return of the characteristic seizures, as shown in the following table:—

Remission of	from	2	to	3	years	observed in	1 case.
,,	,,	3	,,	4	,,	,,	2 cases.
,,	,,	4	,,	5	,,	,,	4 ,,
,,	,,	5	,,	6	,,	,,	2 ,,
,,	,,	6	,,	7	,,	,,	2 ,,
,,	,,	7	,,	8	,,	,,	1 case.
,,	,,	15			,,	,,	1 ,,

It should be pointed out that in all the above cases the disease had been fully established for some years, and that the intervals, therefore, did not correspond to the prolonged periods sometimes found between the first and the second fits, to which reference has already been made.

Two points especially call for attention in this connection. On the one hand, long remissions may occur under bromide administration, to be followed by a relapse when the drug is omitted. On the other hand, a remission of long duration may be broken by an accidental circumstance, such as a blow upon the head, a fall, childbirth, or an acute inflammatory disorder. Hence it is apparent that long periods of arrest, though as a rule indicating a favourable prognosis, are not synonymous with the cure of the disease.

Is there a Cure of Epilepsy?—This question may in general terms be answered in the affirmative. Although writers upon epilepsy are generally agreed as to the cure of the disease, there is less general consensus of opinion as to what is the definition of "cure"; that is to say, after what period of arrest a cure may be said to have taken place. The following table shows the number of cases of arrest and of remission, and their duration:—

11	cases	of arrest,	1	of remission,	from	2	to	3	years' duration.
18	,,	,,	2	,,	,,	3	,,	4	,,
10	,,	,,	4	,,	,,	4	,,	5	,,
11	,,	,,	2	,,	,,	5	,,	6	,,
5	,,	,,	2	,,	,,	6	,,	7	,,
8	,,	,,	1	,,	,,	7	,,	8	,,
8	,,	,,	0	,,	,,	8	,,	9	,,
4	,,	,,	0	,,	,,	9	,,	10	,,
5	,,	,,	0	,,	,,	10	,,	11	,,
2	,,	,,	0	,,	,,	11			,,
2	,,	,,	1	,,	,,	15			,,
1	case	,,	0	,,	,,	22			,,
1	,,	,,	0	,,	,,	25			,,

The arrest column shows that the greater number of the cases, that is to say, seventy-one out of the total of eighty-six, were observed for a period of from two to nine years, during which no fits occurred; while of the remission cases, although four showed an arrest of from four to five years, in five a relapse occurred up to eight years, after which time only one was found to relapse. With these results I have thought it unsafe to regard as cured any case of epilepsy in which the seizures have been in abeyance for a period of less than nine years after the disease has become satisfactorily established.

In order to obtain the percentage of cures in the present series, those cases only have been taken which were under observation for a period of at least nine years. They form a total of 147, of which fifteen were arrested for nine or more years, giving a percentage of 10·2 cures. Therefore, although it may be laid down as a general rule that a cure of epilepsy has been established after an arrest of nine years, the fact must be borne in mind that a very small percentage of cases *do* relapse after that period.

A further point of great importance lies in the fact that if any given case of epilepsy is capable of amelioration, a satisfactory response will be apparent within a short time of commencing treatment. Of the series of cases in which the disease was arrested, somewhat over 50 per cent. showed arrest within one year of treatment.

There is a striking harmony between the results obtained and the percentage of cures amongst those authors who have based their observations upon a clear definition of the term "cure of epilepsy," as the following shows:—

Author.	Definition of Cure.	Percentage.
Russell Reynolds . . .	Freedom for four to eight years	10
Habermaas	Five to ten years .	10·3
Turner	Nine years . .	10·2

SYPHILITIC SYNOVITIS IN CHILDREN.[1]

By G. H. Melville Dunlop, M.D., F.R.C.P. Ed., *Physician to the Royal Hospital for Sick Children, Edinburgh.*

(Plates VII. and VIII.)

The subject of syphilitic synovitis in children has not received the attention it deserves from medical and surgical writers, and the importance of the condition entitles it to a much wider recognition than has hitherto been accorded to it. It is generally regarded as an affection of great rarity, and in the text-books on diseases of children it is either completely ignored, or the subject is summarily disposed of, with the statement that such a condition is occasionally, but very rarely met with. In a recently published monograph on the syphilitic manifestations of early life, only half a dozen lines are devoted to a consideration of syphilitic synovitis.

In 1853, Richet first drew attention to the occurrence of inflammation of the joints in syphilitic patients, and since that time articles on the subject have been contributed by Virchow, Lancereaux, Voisin, Clutton, Bowlby, Howard Marsh, and Jonathan Hutchinson, senior and junior, and accounts of cases are to be found scattered through the medical journals. Morgan, who in 1895 wrote a paper on this subject, stated that he had only been able to discover one pathological specimen of syphilitic arthritis in London, in the museum of St. Bartholomew's Hospital. The specimen referred to was the knee-joint from a young man whose case is recorded by Bowlby in the *Medico-Chirurgical Transactions* for 1894. The museum of the Royal College of Surgeons of Edinburgh is to-day in a still worse condition, as it does not contain a single example of syphilitic synovitis, and the only specimens in Edinburgh illustrating this condition, so far as I have been able to discover, are in the museum of the Sick Children's Hospital, where there are two syphilitic knee-joints taken from a boy who died in my ward last year. Yet the condition is by no means so uncommon as the foregoing remarks would lead one to suppose. Von Hippel has published an account of forty-three cases which occurred in his own practice. Jonathan Hutchinson has treated twenty cases, Clutton records eleven cases, and I have collected sixteen cases, which have been either under my own care, or under the care of my medical and surgical colleagues in the Sick Children's Hospital.

Von Hippel maintains that there was a history of joint involvement in 56 per cent. of all his cases of hereditary syphilis. Fournier in 212 cases of hereditary syphilis found synovitis present eighty-two times, being 39 per cent. of his cases, and

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[1] Read before the Medico-Chirurgical Society, November 2, 1904.

Schüller estimates that syphilis accounts for 7 per cent. of all diseased joint conditions in children.

Probably many cases are unrecognised and are treated as tuberculous, or as subacute rheumatism; and there is good reason to believe that many chronic, long-standing cases of joint disease which resist treatment are examples of syphilitic synovitis. The recognition of the condition is of great importance to the patient, as, if the affection is diagnosed, and the case is subjected to anti-syphilitic treatment, complete recovery is generally obtained; whereas, if it is unrecognised and treated as a tuberculous joint by rest and splints, adhesions are liable to be set up, and eventually fibrous ankylosis of the joint may supervene. For these reasons I have ventured to bring this paper before the Society, in the hope of directing more attention to the subject.

Syphilitic arthritis in childhood may be the result of either the congenital or the acquired disease, the former being much the commoner of the two. The synovitis may arise from a variety of causes, and Jonathan Hutchinson, junior, in his Erasmus Wilson lecture, before the Royal College of Surgeons of England in 1892, stated than any of the tertiary affections of the adult may also occur in the late stages of congenital syphilis in the child. An acute synovitis lasting some weeks is said sometimes to occur in infants before the eruption, corresponding to the prodromal arthritis seen in adults, but I have never yet had an opportunity of seeing a case of this nature. Again, we may find synovitis arising from the presence of gumma in the synovial membrane or in the perisynovial fibrous tissues of the joint. It often occurs in these cases that the deeper layers of the synovial membrane are infiltrated with gumma, while the endothelial lining membrane of the joint is not affected, but is simply bulged into the joint cavity by those inflammatory products. Sometimes the synovitis is secondary to osseous nodes, or gumma in the substance of the ends of the bones entering into the formation of the joints. In these cases the ends of the bones are sometimes greatly enlarged and tender on palpation, and the condition has been mistaken for a sarcomatous tumour, and on more than one occasion unfortunately a limb has been amputated on this supposition. Schüller and Bowlby describe a condition of chondro-arthritis or osteo-arthritis, in which the articular ends of the bones, instead of having a smooth cartilaginous surface, have a gouged-out appearance, with irregular, thickened, and crescentic edges, due to a rarefying osteitis. Similar cases are described by Virchow, and there are several specimens in his museum illustrating this condition.

It is unnecessary to do more than merely mention these conditions, as they are all of extreme rarity during childhood.

For all practical purposes, the syphilitic joint affections of early life may be classified under two headings—(1) Those in which the synovitis occurs in infants, subsequently to an epiphysitis by continuity. (2) Those in which a chronic effusion takes place into one or more joints, especially the knees, between the ages of 8 and 15, and in which the synovitis is the primary and the chief affection. Those two forms are only associated with congenital syphilis.

SYPHILITIC EPIPHYSITIS in young subjects has been so fully described by Taylor, Barlow, Fournier, and Parrot, that I need only refer briefly to the synovitis which is consecutive to the bone disease.

Pathology.—At the junction of the epiphysis and the diaphysis we find an increased number of proliferating cartilage cells, and retarded ossification of already calcified tissue, producing an area of irregular thickening; on section we find a reddish-yellow zone of degenerating cartilage cells running across the epiphysial cartilage. The vascular supply is either arrested or interfered with, and in consequence a low form of caseous inflammation is set up, and a layer of necrotic tissue formed. When the destruction of tissue is sufficiently great, it is at this point that separation between the epiphysis and diaphysis takes place. If subjected to proper treatment, union again occurs without causing deformity. In other cases the degenerative changes continue, and suppuration ensues at the epiphysial line, and the abscess bursts into the joint, producing a purulent synovitis. In the latter case it may be doubted if the syphilis has anything to do with the suppuration, which is more probably due to infection with pyogenic germs. The periosteum is also affected and becomes greatly thickened, the thickening extending a considerable distance along the shaft of the bone.

Symptoms.—The condition develops very rapidly and is accompanied by well-pronounced signs of inflammation.

It is the earliest syphilitic manifestation of bone and joint disease, and generally occurs in young infants, the subjects of congenital syphilis, during the first three months of life, and the symptoms are usually well-marked and very typical. Although any of the joints may be involved in this process, the elbows, the wrists, the knees, and the ankles are the ones most generally affected. The arms suffer much more frequently than the legs, and the distal joints are more often implicated than the proximal ones. As a rule the affection is symmetrical, but the tendency is for the one joint to be much more seriously involved than the corresponding joint on the opposite side of the body. On examination it is found that the ends of the bones are thickened and the tissues covering them œdematous, and that the joints contain fluid. Usually there is considerable tenderness, and when the joints are handled the child cries out, but pain is not an invariable symptom, and there may be considerable swelling with no obvious sensory disturbance. It is noticed that the infant does not use the affected limb, which hangs limp, useless, and immobile; and if lifted and let go, it at once falls heavily, without resistance, as if paralysed. To this condition the name of syphilitic pseudoparalysis has been applied by Parrot. When the epiphysis has become detached, there is unnatural mobility and dangling of the limb, but crepitus is seldom obtained. The cause of the paralysis is obscure, although it is generally attributed to pain, but whatever its origin it entirely disappears on the diminution of the swelling.

Prognosis.—The prognosis is favourable if treatment is early adopted, especially if only one joint be involved; and the ultimate function of the limb is little if at all interfered with. The epiphysis becomes reunited to the shaft without causing shortening of the limb, and the synovial fluid is absorbed without leaving damage to the joint, except perhaps a few adhesions. If there is great destruction of cartilage, the limb is permanently shortened. When several joints are involved, owing to the great constitutional disturbance, the prognosis is not so good. Occasionally suppuration takes place, but suppuration is rare in the long bones in young infants, although it is fairly common in the phalanges of the fingers.

The two following cases which I had recently under treatment exemplify the conditions I have been describing:—

CASE 1.—An infant, æt. 6 months, was brought to the Children's Hospital suffering from coryza, fissured lips, a macular eruption, and condyloma round the anus, on the buttocks, scrotum, and inner aspect of the thighs. Both arms were completely paralysed, and there was no attempt at movement in either arms or hands. The lower ends of both humeri were greatly swollen and exceedingly painful on pressure, and fluid was present in the elbow-joints. Under mercurial inunction the swelling of the bones and the joint effusion quickly disappeared, and in about a fortnight the mobility of the arms had completely returned.

CASE 2.—A child, æt. 3 months, had suffered from coryza from birth, and a papular eruption was present on the chin and upper lips. There was desquamation of the epidermis on the soles of the feet and palms of the hands, and the nostrils were blocked by scabs. Tender swellings were present at the lower ends of both radii and ulnæ, and also of the left thigh. The wrist-joints were involved, and the hands appeared to be completely paralysed. Under treatment the swellings and paralysis gradually disappeared.

The clinical symptoms of the second variety of syphilitic arthritis, to which I desire to draw attention—namely, the true chronic syphilitic synovitis—are very characteristic, and if they are fully developed there should be little difficulty in recognising the condition. The most striking features of this affection are—(1) Its insidious development. (2) Its chronic course. (3) Its symmetrical distribution. (4) Its freedom from pain, and the mobility of the joints on passive movement. (5) Its association with other syphilitic stigmata. (6) Its amenability to treatment.

(7) Its tendency to relapse. This form of synovitis is one of the late tertiary developments. It occurs as a rule between the eighth and fifteenth years, though cases are recorded occurring as early as three and a half and as late as the nineteenth year. There is generally some difficulty in discovering when the synovitis commenced, as the effusion develops very gradually and insidiously, and it is often discovered quite accidentally, as it is usually unaccompanied by pain, and apart from the swelling gives no indication of its presence. In one of my cases the effusion developed very rapidly, when the child was under treatment for keratitis, but this is quite exceptional. One of the most remarkable characters of the joint effusion is its symmetrical distribution. Various joints may be involved spontaneously or consecutively, but in the great majority of cases the knees are the joints implicated. It is difficult to understand this preference for the knee-joints. Although the synovitis seems only to attack the larger joints, it is curious that there is no recorded instance of either the hip or the shoulder being involved. In the sixteen cases to which I have referred, both knees were affected twelve times alone, and fourteen times in association with other joints. In the two cases in which the knees were unaffected, the joints involved were the wrists and ankles in one case, and the ankles alone in the other. In von Hippel's forty-three cases the knee-joint was involved forty-one times, and in thirty-five cases it was the only joint attacked (Plate VII., Figs. 1 and 2).

In one of my cases, the knees, ankles, and wrists were all involved; and in a unique case, described by Maynard, the ankles, wrists, knees, and elbows were consecutively invaded. Usually within a month or two of the effusion declaring itself in the one knee, wrist, or ankle, the joint on the opposite side of the body becomes similarly involved. The interval varies from a few weeks to a couple of years, but, owing to the insidious nature of the effusion, the commencement of the swelling of the second knee is as often overlooked as it was in the case of the joint first attacked. As a rule, one joint is much more swollen than the joint on the opposite side of the body. On examining the affected joints, we find that they are considerably swollen, but the swelling is not caused by any enlargement in the ends of the bones, but is principally due to the synovial effusion, which is sometimes fairly extensive. Occasionally the synovial membrane feels thickened, and the joint has a feeling of flaccid fluctuation but is never tense. There is no heat in the joint, no redness of skin, no starting at night, no creaking in the joint, and no atrophy of muscle. The examination causes no tenderness, and the joint movements are free or at most very slightly interfered with on passive movement. There is no disturbance of function, and the patient simply complains of some stiffness on attempting to move the joint. As a rule there is little or no pain, but in a few of my

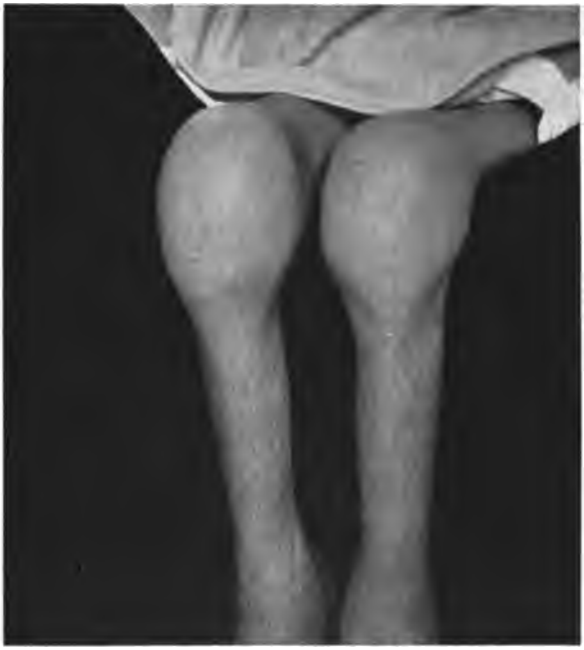


FIG. 1.

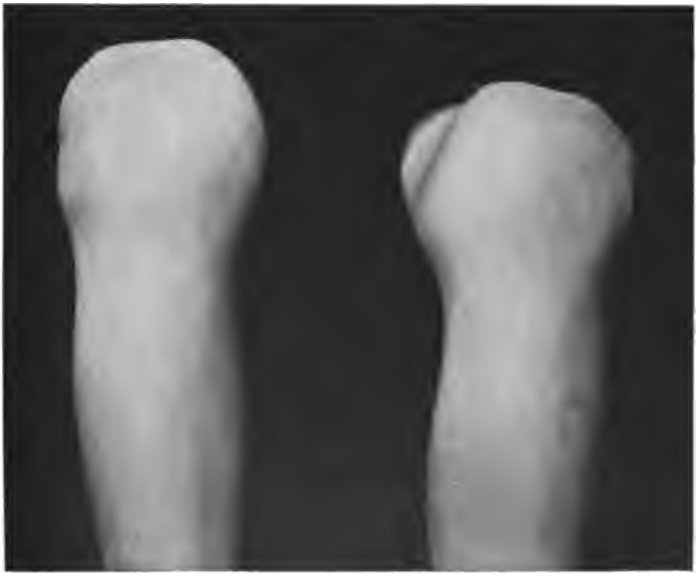


FIG. 2.

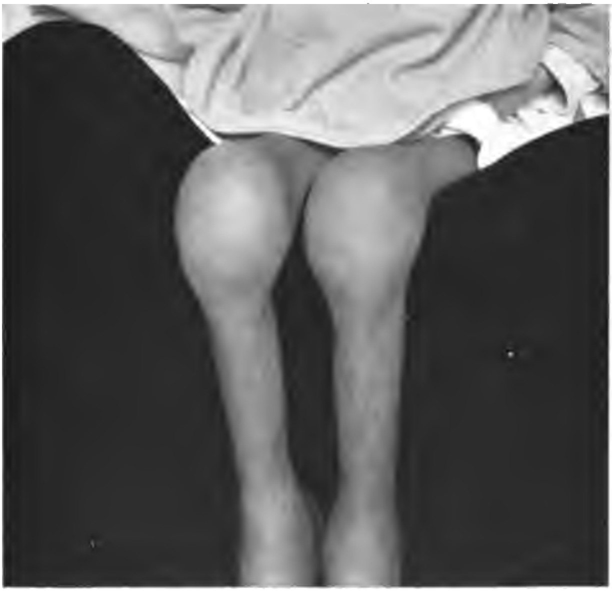
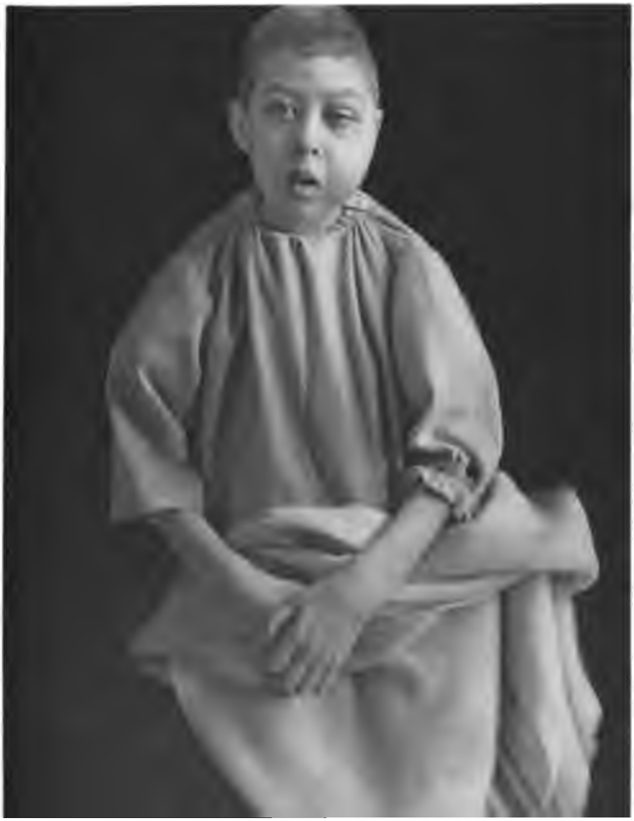


FIG. 3.



cases neuralgic pains occurred at night. An important feature in these cases is; that they are frequently associated with other late symptoms of hereditary syphilis (Plate VIII., Figs. 3 and 4). Keratitis accompanies or precedes the synovitis in about 75 per cent. of the cases. As a rule, the joints are first involved, and the eye trouble follows later; but sometimes the reverse takes place, and in these cases attention is frequently first directed to the synovitis by the ophthalmic surgeon who is treating the keratitis. The condition commences with ciliary congestion and cloudiness, which gradually increases until complete opacity of the cornea ensues. First one eye is affected, and after an interval, varying from a few months to a couple of years, the other eye is similarly attacked. The invariable tendency of the keratitis is toward recovery, although a few nebulæ may be left. There is a striking similarity between the synovitis and the keratitis. Both knees and both eyes are affected, and an interval occurs between the commencement of symptoms in each case. Both conditions are very chronic, and produce little or no destructive changes in the tissues involved, and both are very liable to relapse. Finally, both occur between eight and fifteen years. The other stigmata of the disease which frequently occur in connection with the synovitis are pegging, dwarfing, and notching of the permanent upper incisor teeth, the occurrence of absolute deafness in both ears without any history of previous ear trouble, and the presence of nodes on the long bones in the neighbourhood of the joints, especially on the radius and ulna. Of my sixteen cases, twelve developed keratitis, four had periostitis, three suffered from deafness, and only in two is it noted that Hutchinson's teeth were present. This bears out von Hippel's opinion, that syphilitic joint trouble is much more common than the development of Hutchinson's teeth, and he considers that in the endeavour to establish a history of hereditary syphilis, the occurrence of joint effusion should always be inquired into. The course of the arthritis is as chronic in its duration as the commencement is slow and insidious, the symptoms remaining unimproved for months and sometimes for years unless suitable treatment is employed. On the other hand, improvement occasionally takes place spontaneously, and the effusion clears up in a month or two. Relapses are exceedingly common, and with each relapse the tendency is for fresh joints to be involved.

Pathology.—Death so rarely occurs in those cases of syphilitic synovitis, that we very seldom have a post-mortem opportunity of examining the joints. There is thus meagre evidence concerning the pathology of this condition. In many cases, with the exception of the effusion into the joint, no apparent change can be discovered in the synovial membrane. In some cases opened during life, on the assumption that they were tuberculous, no gummatous infiltration was discovered on the most careful investigation, and the only alteration found, in addition to the hydrops of the joint, was a slight hyperæmia of the synovial membrane. Considerable doubt exists in the minds of many observers, if a true chronic syphilitic synovitis ever occurs; and they believe that, in those cases in which the joint has been opened without revealing any apparent change, there must exist a microscopic gummatous infiltration of the synovial membrane, or some underlying osseous mischief. Others again, while able to give no satisfactory explanation for the presence of the effusion, firmly maintain that no other change except the slowly increasing effusion is to be found, and that, in short, the condition presents itself as a subacute synovitis, brought about solely by the syphilitic poison, and having no distinctive characters. Which of these two opinions is the correct explanation of the synovitis, time and further investigation alone can determine.

In a considerable proportion of the cases, however, well-marked pathological changes are present. In them the synovial membrane is infiltrated and studded with gumma, and the membrane is everywhere thickened and much more vascular than normal. Villous processes develop on the endothelial aspect of the membrane, and the synovial fringes are particularly infiltrated, hanging down into the joint and filling its cavity with a soft, gelatinous, poorly developed material, resembling that seen in tuberculous joints. It presents a soft, reddish, elastic appearance, and in the centre it is greyish-white, and caseated very like the granulation tissue of tuberculous disease; on account of this resemblance, the condition was named by Richet the syphilitic pseudo-white swelling. In some cases nodes are felt in the capsule of the joint, giving it a firm, almost cartilaginous feeling. Under treatment, the new tissue undergoes absorption and organises, leaving some thickening of the joint. The exudation consists of turbid serum, and is only purulent when due to a burst gumma.

Diagnosis.—As the existence of syphilitic synovitis becomes better understood, many cases, previously classified as tuberculous, will be recognised as having a specific origin. The main points to be relied upon, in establishing the syphilitic nature of this affection, are the bilateral effusion into the knees, the absence of pain, and the small amount of functional disturbance. If we further find that the synovitis is associated with other syphilitic stigmata, and that it improves on being subjected to anti-syphilitic treatment, there should be no difficulty in arriving at a diagnosis.

Clutton remarks, in his paper on this subject, that he has never seen both knee-joints filled with fluid, causing no pain, while the other joints remain unaffected, except in cases of hereditary syphilis. The line of demarcation between syphilis and tubercle is sometimes very difficult, if not impossible, both clinically and pathologically. I suspect that many of these chronic joint affections, regarded as tuberculous, which for long have resisted treatment and then suddenly recovered spontaneously, are examples of syphilitic and not of tuberculous synovitis. In each case there is the same doughy, elastic feeling, with not a great deal of fluid in the joint. The multiplicity of the joints involved, the free movement of the joint, and the absence of pain and starting at night, are in favour of syphilis, and if we can obtain as yphilitic family history and find evidences of periostitis, and a past or present keratitis, our suspicions are strengthened. The fact that there are never any destructive changes in the joint, and that the process never ends in suppuration, is still another factor favouring syphilis. The difficulty in many of these cases is solved by their almost miraculous improvement under anti-syphilitic treatment. Still, as Mr. Hutchinson remarks, it cannot be said that because a joint does not improve under syphilitic remedies it is not syphilitic. Further, we have frequently to recognise the fact that we have to deal with a mixed infection of syphilis and tubercle. As an instance of how the two processes react on each other, Mr. Marmaduke Sheild points to the virulence with which lupus attacks cases of congenital syphilis.

Treatment.—As a rule, this form of synovitis is very responsive to treatment, and complete recovery ensues on submitting the patient to an anti-syphilitic regimen. Treatment by rest, counter-irritation, splints, and the ordinary methods employed in simple synovitis, appears to have little if any effect in influencing the condition. The improvement is much more rapid upon a combination of mercury and iodide of potassium than upon mercury alone. Gutterbock recommends the employment of sublimate baths as being more efficacious than the internal administration of mercury; others pin their faith to the local application of mercurial ointment. Cases crop up every now and again which for many months resist all treatment and then suddenly recover. There is frequently a marked tendency to the recurrence of the synovitis on the cessation of treatment.

THE RELATIONS OF THE INSANITIES TO CRIMINAL RESPONSIBILITY AND CIVIL CAPACITY.

By Sir John Batty Tuke, M.D., F.R.C.P.Ed.; and
Charles R. A. Howden, M.A., *Advocate.*

IX.

(*Continued from page* 441.)

We must now consider the presumptions according to which, in the many doubtful cases of responsibility, the guilt or innocence of the accused ought to be determined. The ruling presumption of the criminal law in this country is, of course, that every man is presumed to be innocent until he is proved to be guilty, and this, if strictly carried out, would throw upon the prosecution the burden of proving the sanity of the accused, for the capacity of free action and consequent responsibility is an essential element of guilt. But the general presumption is overridden by the presumption of sanity, under which every man is presumed to be sane until the contrary is proved. In America, considerable discussion has taken place as to the precise force of this presumption. Some of the Courts have gone so far as to decide that the jury is bound to acquit the prisoner when the result of the evidence is to leave a reasonable doubt of his sanity. Others have laid down that, in order to acquit, the preponderance of evidence must be in favour of insanity.[1]

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[1] In *Cunningham* v. *State*, 1879, 31 Am. Rep. 360; 56 Miss. 269, Mr. Justice Chalmers said: "Three distinct theories are held by Courts and text writers of the highest character, and each may be supported by a large array of respectable authorities, namely: (1) The prisoner must prove his insanity beyond a reasonable doubt. (2) He must establish it by a preponderance of evidence. (3) He must raise a reasonable doubt of his sanity. The first of these views receives most countenance from English adjudications and text-books; the second is supported by a majority of the American Courts; while the third, while held as yet by a minority of the adjudged cases, is gaining in favour, is the well-settled law of many of the States, and is supported by a power of reasoning which we deem convincing." In this case the law was laid down as follows:—"We think the true rule is this: Every man is presumed to be sane, and in the absence of testimony engendering a reasonable doubt of his sanity, no evidence on the subject need be offered; but whenever the question of sanity is raised, and put in issue by such facts, proven on either side, as engender such doubt, it devolves upon the State to remove it, and to establish the sanity of the prisoner to the satisfaction of the jury, beyond all reasonable doubt arising out of all the evidence in the case." In Guetig *v.* State, 1879, 32 Am. Rep. 99 (Indiana), the jury were instructed to acquit "if the evidence engenders a reasonable doubt" of the prisoner's mental capacity at the time of the act. In State *v.* Jones, 1871, 9 Am. Rep. 242; 50 N. H. 369, the jury were instructed to acquit, unless they were satisfied beyond reasonable doubt that the killing was not produced by mental disease. On the other hand, in Ortwein *v.* Commonwealth, 1875, 18 Am. Rep. 420; 76 Penn. 414, the instruction was asked, "If the jury have a reasonable doubt of the sanity of the prisoner at the time of the killing they cannot convict," and refused, partly on general grounds of expediency, partly on the ground that by the Criminal Code the verdict must find the fact of insanity. In the more

It is difficult to draw any very tangible or practical line between this latter view and the rule which governs our Courts that the fact of insanity must be clearly proved.[1] In practice this rule is interpreted to mean, not that insanity must be proved beyond all possible doubt, but that the jury must be reasonably satisfied of its existence; and such a rule appears to us to be better than one which requires the jury to return a verdict of acquittal whenever they entertain a doubt as to the prisoner's sanity. The condition of insanity is so entirely exceptional, that the presumption of sanity is clearly the natural one. And although it may be argued with considerable force that in theory facts may be proved which, although insufficient to establish clearly the existence of insanity, may yet be quite enough to destroy the force of the natural presumption, there are nevertheless grounds which make it inexpedient to adopt this doctrine. If permission were accorded to juries to acquit the accused on a mere suspicion of insanity, it might unquestionably be misused; the doubt might be vaguely extended far beyond its legitimate bounds; and, besides, there are really very few cases in which the uncertainty might not be cleared up by proper examination and evidence.[2]

But although it may thus be admitted that the presumption of sanity ought to continue in force until the existence of insanity is proved, there is a question beyond this which stands in a different position. Irresponsibility cannot be inferred immediately from the bare existence of a morbid mental condition. There may be mental states which are undoubtedly morbid, but which are not in themselves sufficient to avoid responsibility. The English presumption, as appears from the opinions in Macnaughton's case, covers any doubt which may arise at this point, and requires it to be proved, not merely that the accused is suffering from mental disease or defect, but that the actual

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recent cases the rule seems to have been accepted, that "a preponderance of evidence" is all that is required. In Ryder *v.* State, 1897, 62 Am. Rep. 334 (Georgia), it was laid down that the burden was on the accused to show affirmatively by a preponderance of evidence that he was insane at the time of committing the act; and that, though this burden may not be successfully carried so as to authorise a verdict of not guilty on this particular ground, it is nevertheless the duty of the jury to consider the evidence touching the alleged insanity in connection with the other evidence in the case, so as to determine whether or not a reasonable doubt of the guilt of the accused exists in their minds. In Kelch *v.* State, 1896, 60 Am. Rep. 680 (Ohio), it was held that a bare preponderance of evidence was all that was required to overcome the presumption of sanity, and a direction that the accused must prove his sanity to the satisfaction of the jury was overruled.

[1] Opinions of Judges in Macnaughton's Case, 1843, 1 C. & P. 131.

[2] The question how far the mere suspicion of insanity ought to be permitted to affect the ordinary administration of the law, differs materially from the question whether it may not be a legitimate exercise of discretion to prevent in such cases the infliction of capital punishment. The difference, of course, lies in the irrevocability of the capital penalty. In the case of other punishments the error may be so far corrected if the prisoner subsequently prove to be insane.

mental results are such as to destroy the conditions of responsibility. In point of fact, the law presumes not merely that every person is sane, but that every insane person is responsible. But when looked at from this point of view, the presumption is a very different one from the simple presumption that everyone is in a state of mental sanity. The mere presumption of sanity is a natural one, because it represents a very great probability. But it is the very reverse of probable that an insane person is in a state of mind which infers responsibility. Under any reasonable standard of responsibility, the probability is very great indeed that any person who is insane at all ought to be acquitted. In so far, therefore, as a presumption serves to determine the verdict in doubtful cases on grounds of general probability, it ought in this instance to be reversed. And in this case also there are very special reasons why the burden of proof ought not to be thrown on the defence. We have already dwelt on the extraordinary difficulty of arriving at an exact understanding of the mental condition of the insane. Very often it is impossible to offer direct proof of irresponsibility. There are many cases which we can only deal with by inferences derived from our general experience of the class to which they belong, and in such cases the rigid application of a presumption in favour of the prosecution would inevitably lead to injustice. In the majority of the cases in which there is no direct proof of the mental condition at the time of the act, the probability is that the mental disturbance is very much greater than what appears on the surface, and it is therefore very much safer that when the existence of insanity is proved we should presume irresponsibility, unless the jury can be satisfied of the contrary. The objections which apply to presuming insanity in cases where the defence has raised a doubt as to the sanity of the prisoner, cannot be urged here with the same force. The necessity of proving in the first instance the existence of mental disease or defect, is enough to limit the exemption to a class of cases in which any latitude of treatment is comparatively innocuous.

We are speaking here of presumptions in their legal sense, as those rules of law which, founded partly upon data of probability and partly upon expediency, determine the burden of proof and the decision of the case when the actual state of fact cannot be completely ascertained. There are, of course, numerous presumptions in the ordinary sense, so-called presumptions of fact, which are merely the most natural inferences from the evidence, and which vary very much in their force according to the particular kind of case. In many instances our conclusions as to the mental state of the case at the time of the act in question rest very much on this kind of evidence; and in many cases it may really be strong enough to overcome an adverse legal presumption. In all those cases, for instance, where the mind is affected by an active morbid process or by some considerable functional disturbance, as, for instance, in idiopathic mania and melancholia, general paralysis, epileptic paroxysmal attacks, and other grave forms of disease, we are entitled to affirm, from general experience, that the inference as to the mental state from the mere existence of the disease is strong enough to establish irresponsibility even in the absence of direct evidence. And in the more varying forms we find groups of a special type characterised by mental peculiarities which in themselves do not appear directly sufficient to avoid responsibility, but which indicate with sufficient certainty a much more serious disturbance, as, for example, in the well-known cases which are characterised by delusions of persecution. In all these cases the inference from the mere existence of the particular form of insanity, although in a sense presumptive in its character, is nevertheless so strong, that even under the present rule there really ought to be no difficulty, in the absence of direct evidence as to the mental state, in the way of admitting it as sufficient proof. But in other classes of cases the presumption is not nearly so strong. There may be many cases amongst them which are unquestionably irresponsible, and others which are not so, and it may be extremely difficult to determine to which category each particular case belongs. In such instances the present rule would, if strictly carried out, ensure conviction in the face of a great probability that the subject was really irresponsible. In many other cases, of course, we have no reason to suppose that there is anything occult about the mental character, and in such instances an alteration of the existing presumption of responsibility would simply incline the jury to an acquittal in the event of the case being a very narrow one, and would throw upon the prosecution rather than upon the defence the burden of thoroughly investigating the mental character of the accused.

Even with regard to the existence of insanity apart from all question of its degree or effect, there are certain of these inferences or presumptions which one would almost say were strong enough to upset the ordinary presumption of sanity, and which are at all events such as demand the greatest care in the investigation of the case. The fact, for instance, of a prisoner being shown, not merely to possess insane hereditary antecedents, but to be himself affected by peculiarities that seem referable to the insane hereditary factor, is in itself a ground for attributing with considerable probability any singular act to its influence; although the inference requires to be made with some restrictions and with a certain amount of caution. In the same way, very slight indications indeed would lead us to presume, with great probability, the existence of insanity in the case of a person who had unquestionably suffered from a previous attack, but who had apparently recovered. The proof of epileptic attacks, although merely convulsive in their character, would go a long way to establish the probability of a defence founded upon the hypothesis of some of the obscurer forms of epileptic insanity. But these are questions which do not especially belong to the criminal law, and we refer to them here simply as showing that in certain circumstances even the presumption which goes no further than the mere existence of insanity, although perhaps on the whole very expedient, does not always represent the real probabilities of the case.

IMPACTION OF A GOLD TOOTH-PLATE IN THE UPPER THORACIC PART OF THE ŒSOPHAGUS: ŒSOPHAGOTOMY.

By C. B. KEETLEY, F.R.C.S., *Surgeon to the West London Hospital;* and ALGERNON WESTLAKE, M.B., C.M. Edin., *Surgeon to the Grimsby Hospital.*

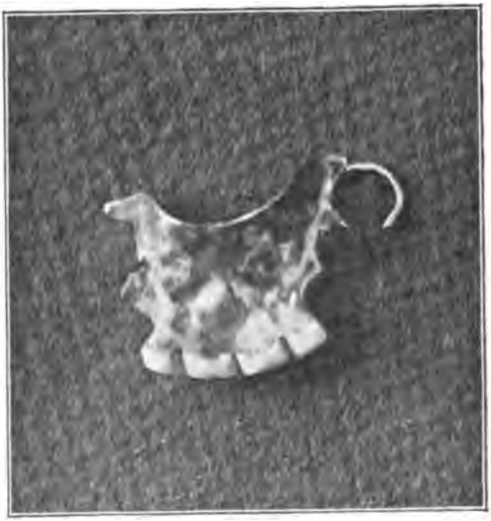
CASE.—On 1st April 1903, the patient, Mr. F. A., æt. 30, fell, and swallowed a gold tooth-plate with four upper incisor teeth attached. One of the hooks had previously been broken off. Expecting it would pass per rectum, he did not consult a medical man till 21st April, when he saw Dr. Francis of North Thoresby, who sent him to Grimsby. His condition, when seen by Dr. A. Westlake of Grimsby, on 26th April, was as follows:—There was pain in the right side of the chest, about the junction of the second rib with the sternum, increased on swallowing, and tenderness when the fingers were pressed on the episternal notch towards the thorax. A bougie was obstructed 6 in. down the œsophagus, and auscultation discovered a difficulty in the passage of fluid.

On 27th April, Dr. Westlake and Dr. C. B. Turner of Grimsby used the X-rays and screen. The plate was seen lying somewhat transversely at about the level of the first rib. On 4th May, Dr. Harrison Low took a skiagram, which showed that the plate lay behind the upper end of the sternum, extending obliquely downwards to the right, where it was behind the junction of the second rib with the sternum. The patient could not swallow solids at all, and liquids only with difficulty, and had a cough.

Remembering that it had been embedded in the same position for five weeks, it was judged safer to remove it by a cervical œsophagotomy than by attempting to dislodge it and extract it through the mouth.

On 6th May the œsophagus was exposed on the left side, at the root of the neck. It was there found dilated, the dilatation extending into the thorax. It was incised longitudinally on a sound passed through the mouth. Some grey muco-purulent discharge escaped. A fore-finger, insinuated downwards through the incision, just reached the tooth-plate. This was seized with lithotomy forceps, and found firmly fixed. Gentle see-sawing and to-and-fro movements moved it a little, and by continuing these, and occasionally altering the place of application of the forceps, the plate was gradually brought into sight and pulled out. The process of extraction greatly enlarged the incision in the œsophagus. Dirty granulations were swabbed out of the cavity where the plate had lain, The mucous membrane was sutured by three interrupted catgut sutures. A rubber and a gauze drain were carried down to the hole in the gullet. Two layers of sutures closed the remaining part of the muscle and skin wound respectively. Most of these were removed in a few days, as there was some redness and swelling.

The patient was allowed to swallow several meals of sterilised milk a day, and after each he swallowed a quantity of hot water, and had the wound syringed out with hot water. For some days most of the fluid swallowed escaped through the wound, which, however, in about a fortnight became practically water-tight. The patient found there was least leakage when he swallowed with his head turned to the right.



His cough soon passed away, and his throat, etc., are now quite well. The photograph is by Mr. Jancowski of Grimsby.

REMARKS.—Cervical œsophagotomy is a safe operation if certain points are attended to. (1) A sufficient incision should be made to expose plainly the deeper parts and to enable the surgeon to see that he does not interfere with the recurrent laryngeal, and also to recognise the œsophagus, which is similar in colour to the parts around it. (2) It should be remembered that, in a case like this, the wound is sure to be infected both by the foreign body at the operation and from the wound in the œsophagus during the after-treatment. Therefore it should be kept well open by gauze packing and by a rubber drain, and sutured only with great discretion. (3) The meals should be liquid, infrequent, and copious, and each followed by well washing out, accomplished both by swallowing hot water and by syringing with it. (4) The mucous membrane and muscular coat of the œsophagus are so loosely united, that, if sutured in two close and distinct layers, a dangerous suppuration might extend down between them.

Granting cervical œsophagotomy to be a safe operation *per se*, its advantages for the removal of a sharp-edged foreign body impacted near the large vessels, below the root of the neck, are obvious. The surgeon has the region of operation under his control and in reach of his fingers, should severe hæmorrhage be caused by his manœuvres. And he is less likely to cause hæmorrhage than if operating at the considerable distance which separates the mouth from the thorax.

REVIEWS OF BRITISH AND FOREIGN LITERATURE.

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A Manual of Operative Surgery. By Sir FREDERICK TREVES and JONATHAN HUTCHINSON, Junior. 2 Vols. London: Cassell & Co., Ltd. 1903.

IN its original form, this work, although generally recognised as an authoritative treatise on the operations of surgery, never really attained the popularity which it seemed to deserve. It might have been described as dogmatic without being convincing, as lengthy without being satisfying, and as practical without affording a useful guide in practice. Still, in part no doubt, owing to the great reputation of its author, it enjoyed an extensive circulation, and was thrice reprinted.

Of the present edition, it is advertised that "it has been revised throughout, many sections have been rewritten or have been remodelled, and every attempt has been made to bring the work up to date," and the main part of the work of revision has been carried out by Mr. Jonathan Hutchinson, Junior, one of the best-known members of the acting staff of the London Hospital.

The lucid and attractive style which characterises all the published writings of Sir Frederick Treves is still in evidence, rivetting the attention of the reader and impressing him with the essentials of what is under discussion, while at times it is so racy and so pointed with flashes of humour that it rises far above the monotonous level of the average text-book of operative surgery.

The difficult task of bringing the work up to date has, on the whole, been skilfully carried out by Mr. Hutchinson, whose achievements are best appreciated by comparing the present with the former edition. Many useful illustrations have been added, and others have been omitted. The latter fate might have been extended with advantage to, among others, that which is intended to represent the relations of the kidneys to the parietes, for it is anatomically incorrect. The elimination of the description of obsolete operations might also have been extended with advantage; it is scarcely "up to date" to devote ten pages to lumbar colotomy and sixteen to lateral lithotomy when both these procedures disappeared from practice many years ago.

Many of the valuable observations which we owe to the genius of the Professor of Surgery in the University of Bern are either not mentioned in the present work, or are referred to in such fragmentary fashion as to be of little service. The old-fashioned vertical incisions in the neck are still adhered to, Kocher's methods of excising the elbow, hip, and ankle, are not quoted, while his method of excising the knee is dismissed in a few misleading lines of the text; his incisions for thyroidectomy are described inaccurately.

There are also important omissions from other sources, such, for example, as Lane's operation for cleft palate, Maydl's and Peters' operations for ectopia of the bladder, and M'Burney's gridiron method of opening the abdominal cavity.

Clinical Lectures on Mental Diseases. By T. S. CLOUSTON, M.D., F.R.C.P. Ed. Sixth Edition. London: J. & A. Churchill.

THE fact that Dr. Clouston's "Clinical Lectures" has gone through so many editions is a sufficient testimony to its popularity and worth. One reason why this is so, is undoubtedly that each successive edition is carefully revised and brought thoroughly up to date, so that anyone reading it may feel that he is getting the latest facts and speculations on the subject. The latest edition, recently published, very worthily upholds the tradition established by its predecessors in this respect. Its general characters are so well known that it is quite unnecessary at this time of day to emphasize its excellences. All that is really necessary now is to point out in what respects changes and improvements have been made.

The system of classification adopted in the first edition is very wisely still adhered to. Recent views on this much debated question are referred to and criticised with fairness. That the old order is bound to change, every sensible person will acknowledge, but the unanimity necessary for this step has not yet been reached, and in the meantime suggestion and criticism are preparing the way. The same may be said of the views, associated chiefly with the name of Ford Robertson, of the bacterial origin of some mental diseases. While useful in suggesting fresh methods of attacking old problems, these views cannot yet be considered as established on an indisputable basis of fact. Their chief value is in the direction of bringing mental disease more into line with other branches of medicine by grounding it on a secure foundation of pathology.

Notice must be taken of the many new and excellent illustrations which appear in this edition. This is especially the case with those referring to general paralysis. There is no better series in any other text-book at present. They give, within reasonable compass, the gist of what is known of the pathological appearances of that disease. They represent the goal towards which alienists are striving, not only in general paralysis, but in all other forms of mental disease. May this goal soon be reached. What strikes one, on re-reading this book after several years' interval, is its great suggestiveness, its opening out of new lines of thought in directions deemed before exhausted. This is a most valuable quality in any book, and goes far to explain the high position occupied by Dr. Clouston's Lectures as a standard work.

Physical Chemistry for Physicians and Biologists. By Dr. ERNST COHEN, Professor of General and Organic Chemistry in the University of Utrecht. Authorised Translation from the German, by MARTIN H. FISCHER, M.D. London: George Bell & Sons.

THIS book gives in a permanent form the matter of a series of seventeen lectures delivered by Professor Cohen to a number of physicians, at their special request, to serve as an introduction to modern physical chemistry, especially in its relation to physiology and other branches of science with which medical men are intimately concerned.

It is exceedingly gratifying to find that the importance of physical chemistry to other sciences is becoming realised, and the appearance of this English translation (though intended more immediately for American students) should help towards a much-needed awakening to the necessity of improved chemical training of medical students in this country.

The book is not, and does not pretend to be, a text-book of general physical chemistry. It is intended merely as an introduction to the subject, arranged specially to appeal to those to whom it is more directly addressed, and a perusal of it is strongly recommended to all medical men who are anxious to learn something of the great advances which have been made in chemical theory in recent times, and of the bearing which these have on their own special domains. It is to be feared, however, that even the simple statement of the case here provided will occasionally prove somewhat of a strain to those whose maximum knowledge of chemistry and physics (attained in a more or less remote past) never got beyond the requirements of the First Professional Examination. The majority of the lectures are taken up with the general exposition; some of the later ones deal with the applications to the fields of Hygiene, Pharmacology, Physiology, Osmotic Analysis; while others are devoted to Electro-chemistry.

To the general chemist the parts dealing with the applications to medical subjects are, perhaps, the most interesting, as they present an aspect of the subject which is more novel to him.

It is to be hoped that the book will secure a large number of readers in this country.

A Short Manual of Inorganic Chemistry. By A. Dupré, Ph.D., F.R.S., F.I.C., F.C.S., and H. Wilson Hake, Ph.D., F.I.C., F.C.S. Third Edition (re-issue). London: Charles Griffin & Co., Ltd.

A manual which has attained its third edition evidently possesses features which recommend it to teachers of the subject, and a reviewer at this stage may therefore be excused if he devotes his attention to criticism rather than to an appreciation of what may be the strong points of the book. Unfortunately the occasions for criticism are not few in number, and are such as would make many teachers hesitate to recommend the book for use by their students.

To take a few illustrative examples at random: Although the authors state that "the growing importance of Physical Chemistry . . . has necessitated a thorough revision, . . ." they nevertheless dismiss "theories of solution" in half a page, apparently because neither of those referred to "can be considered as satisfactorily proved"! On page 72 there is a somewhat remarkable definition of "molecular combinations," which would include the great majority of oxygen acids, salts, etc., in that class of substances. Again, prefixed to the discussion of each substance described in detail, there is printed in italics a collection of data respecting physical properties, etc., which the average student would probably think he ought to endeavour to commit to memory. Many of these data are of no real use to the student, and occasionally the statements are misleading or erroneous. Thus we are told on page 267 that the specific gravity of cadmium vapour (H = 1) is 56·2, presumably because this number is exactly one-half of the accepted atomic weight. As a matter of fact, the value has been determined experimentally and found to be about 62. Attempts such as this to make facts square with theory, cannot be too strongly deprecated. In view of the authors' apparent dislike for unproved theories, it is surprising that so much space at the beginning of the book should be devoted to theoretical considerations, many of which, instead of helping the beginner to a proper appreciation of the subject, can only tend to befog him at the very outset.

Finally, what sort of idea will a student derive from a definition of matter (on page 1) as "*that which can be perceived by the senses*"?

Syphilis and Gonorrhœa. By C. H. Marshall, M.D., F.R.C.S., Senior Assistant Surgeon to the Hospital for Diseases of the Skin, Blackfriars, London. London: Rebman, Ltd.

This work must be regarded more in the light of a remembrancer than as a complete and exhaustive treatise. One finds in it the main facts applicable to these diseases presented shortly and compactly indeed, but with scarcely sufficient fulness to satisfy the less experienced. Read after the study of one of the larger expositions, it will be found valuable in recalling the cardinal features and as a test of memory, and so of considerable use for examination purposes. It opens with the history of syphilis, and we have been interested and at the same time amused at some of the statements made therein. As to the antiquity of the disease, little if any doubt exists, but when we are told twice over that Pharaoh contracted syphilis from Sara, Abram's wife, and that the disease spread in his house, the evidence is hardly sufficient. It is, however, possible that the mummy of the monarch in question may be discovered, and corroborative proof obtained. Quoting from Hominic, it is asserted that David suffered from syphilis contracted from Bathsheba, and had a child which died on the seventh day, presumably from this cause. The disease must have been in a severe form to have proved so rapidly fatal, and since both parents were diseased, one is surprised that the next child, the wise Solomon, appears to have wholly escaped. On this assumption the state of Bathsheba may account for Uriah not visiting his wife when recalled, for politic purposes, from the war; but the descriptions in Psalms, assigned to David as their author, suggest at the most that the writer, if describing his own condition, may possibly enough have had syphilis, but furnish no clue as to its source. Such examples of the "higher criticism" are free enough to gratify the aspirations of its most modern votaries.

Under pathology, what is positively known is tersely summed up, special prominence being given to its proneness to attack the blood vessels throughout the body; and the observations on its bacteriology are rehearsed, leading to the deduction, that while it is almost certain that syphilis is a microbial disease, the investigations hitherto published cannot be regarded as conclusive. It seems an omission that the section on the skin does not contain any description of the lesions occurring there themselves, but is a brief though correct recital of the diagnostic points which enable one to arrive at an opinion as to whether a given eruption is specific or not. No doubt this is useful, but it would have been better had the main efflorescences been at least sketched in the first instance. A differential feature laid down as distinctive of the tertiary palmar syphilide is that it appears in the centre of the palm, which eczema rarely does. This, we fear, may be found to be an uncertain guide in determination. Malignant syphilis connotes a term employed by writers to express different views, the determining factor in such cases will probably be found in variations in the resistance of the individual, not solely in the quantity or quality of the virus introduced. The question is discussed from a sound standpoint, and the conclusion arrived at is a sensible and judicious one. A word of recent introduction is parasyphilis, which is applied to lesions not, it is assumed, syphilitic in *nature*, but syphilitic in *origin*. These are not quite the same if the disease occurs in the acquired form, as when it is inherited. Each has its occasional sequelæ, influenced in their characteristics by the mode in which the virus has gained access. The author thinks that too great prominence has been given to the subject, but it is to be borne in mind that in many affections attributed to the results of syphilis we have as yet no better explanation to offer. A few valuable pages are devoted to reinfection and *syphilis d'emblée*, or syphilis occurring without any discoverable primary sore. That in some instances we cannot condescend on the precise spot where the virus entered, is undoubted, and this conceded serves to explain cases where syphilitic manifestations appear in those who deny infection, while admitting exposure. Syphilis and marriage has been recently so exhaustively treated of by Morrow, that we are not surprised that his conclusions are reproduced *in extenso*. The solution of the bearing of syphilis on the question of eligibility for life insurance rests in a measure on the soundness of health, but mainly on the habits of the candidate for insurance. In too many instances syphilis does shorten life; conduct both prior and subsequent to the date of its having been acquired, as well as circumstances of environment, markedly affect the estimate. The balance of opinion, expressed in short compass, supports the view that it exerts an unfavourable influence. The rules for treatment seem to us as sound, though internal medication, regarded in this country with most partiality, is dismissed too briefly. Most of the section devoted to gonorrhœa is occupied with the treatment of the disease or its complications, and many useful hints are furnished, both as regards its management in men and women.

A Text-book of Diseases of Women. By Barton Cooke Hirst, M.D., Professor of Obstetrics in the University of Pennsylvania. Philadelphia, New York, and London: W. B. Saunders & Co.

This work has been prepared as a companion volume to the author's well-known *Text-book of Obstetrics*, which it rivals in excellence. The book is divided into sections rather than chapters, an anatomical or regional classification being adopted as more logical than a purely pathological. For the most part this is convenient, although it necessitates at times a certain amount of cross-reference. Each of the sections—on the vulva, on the vagina, on the cervix, on the uterus, etc.—begins with a full anatomical description, and then follows an account of the injuries, the diseases, and the new growths affecting the part under consideration.

Dr. Hirst belongs to the moderate school, and does not at once recommend operation in all cases. There are many in which he suggests that in the first instance general medical and simple local treatment should be given a fair trial. Indeed, throughout the work the author is especially successful in describing the palliative treatment of diseases of women, and such curative treatment as can be carried out by the general physician.

But Hirst has very definite views on operative gynæcology, and while the methods of other gynæcological surgeons are fully considered, he gives a marked personal stamp to his work, by a description of the means of treatment he has found most useful during an experience of over twenty years. The author prefers the combined vaginal and abdominal operation for carcinoma of the cervix uteri, but he correctly points out that if the parametrium be affected the chances of recurrence are great. One is disappointed to find no reference to "deciduoma malignum" or chorion-epithelioma.

Where all sections are so good, it is difficult to point to any one as of pre-eminent excellence. That on anomalies of development in the genital tract is very complete, and every possible malformation is fully discussed. The section on lacerations and plastic operations is exceptionally lucid and well illustrated, as is also that on diseases of the urinary tract. One of the most interesting sections in the volume is that on the technique of gynæcological surgery. It teems with most valuable suggestions as to the details of operations; and after-treatment, which is so often scantily considered in works of this character, receives its due and proper attention.

The illustrations are numerous and for the most part original; they are excellently reproduced. The book is very readable, although many of the characteristic terms employed, such as "gynecic surgery," seem somewhat foreign to our ear.

Hirst's "Text-book of Diseases of Women" is one of the very best on the subject, and ought to take its place as one of the most popular works on gynæcology. It is thoroughly modern, practical, and scientific, and is adapted in every way to the needs of the medical student, the practitioner, and the specialist.

Transactions of the American Dermatological Association at its Twenty-seventh Annual Meeting, held at Washington in May 1903. Official Report by CHARLES J. WHITE, M.D., Secretary. The Grafton Press, New York.

ONE is sure to find, among the topics discussed year by year at the American Dermatological Association at least several bearing on questions of present interest. Though glanders has been known and described for a very long period, still cases crop up in which even our most recent methods of determination fail to render the diagnosis certain. A fatal instance of this nature is related and figured by Fordyce and Mewborn, in various points closely resembling glanders, yet in which the bacillus mallei was not demonstrable by any one of the many staining agents resorted to. Both Van Harlingen and White concern themselves with eruptions occurring in hysterical subjects, and it must be admitted that it is not always easy to decide, in such cases, whether the skin conditions are self-inflicted, or are traceable to neurotic disturbances connected with the diseased mental state. A good deal of valuable information is conveyed in these papers with respect to a matter which occasions uneasiness alike to the medical attendant and the friends. The literature of the X-rays in their bearing on treatment has now reached extensive proportions, but the articles of Stelwagon and Pusey will be found helpful in arriving at some degree of certainty as to the best apparatus to use, the preferable modes of employing the rays, and the diseases which are amenable to their action. Workers in this line will agree with Pusey when he says "that hypertrichosis is the one condition in which my experience has been less satisfactory than I anticipated." Morrow contributed a long paper on syphilis and the medical secret, one which he subsequently incorporated with his book on syphilis and marriage. It is somewhat curious that in France, while the law insists on a nurse being informed of the nature of the infant's disease before she assumes her duties, there is no corresponding protection to the healthy child against infection by a syphilitic nurse. It appears to us that the only reasonable course is to include syphilis and gonorrhœa under contagious diseases to be reported compulsorily. We believe that in this way a decided reduction in their occurrence would take place, while the authorities would be in a position to locate dangerous foci. With the increasing spread of syphilis, some procedure such as this will require to be instituted. A useful article is written by White, who directs attention to a number of additional substances which may produce inflammation of the skin—dermatitis venenata. On the whole, this volume is fully equal in merit to its predecessors.

Serums, Vaccines, and Toxins in Treatment and Diagnosis. By Wm. Cecil Bosanquet, M.A., M.D. (Oxon.), F.R.C.P. (Lond.). London: Cassell & Co.

In this book Dr. Bosanquet supplies (he will pardon the phrase) "a felt want." At a time when serums, vaccines, and antitoxins succeed each other with bewildering profusion—no less than seven have been introduced in connection with typhoid fever alone—a concise monograph, free from the technical jargon which most writers on immunity find it so difficult to avoid, cannot but be popular. Notwithstanding its modest dimensions, Dr. Bosanquet's book contains so much material that it is impossible in a short review to do more than glance at it. The introductory chapters deal with the general principles of immunity, and the preparation and uses of antitoxins, etc. From them even one hitherto unacquainted with what has been done will gain a fair idea of the progress which bacteriologists are making in this field; and, what is more important, if he read intelligently, will understand why the serum treatment, brilliantly successful in some cases, has failed and must fail in others,—knowledge which will prevent both premature optimism and vain disappointment. The remaining thirteen chapters treat of diphtheria, smallpox, tetanus, snakebite, rabies, plague, typhoid, cholera, coccal infections, tuberculosis, and other less important diseases. Under each head the remedies in vogue or proposed are discussed, and at the end of each chapter Dr. Bosanquet sums up their merits in a series of conclusions—a feature which gives the book a practical character, and in which he shows himself a sane and not too sanguine critic. He is heartily to be congratulated on the production of this text-book, which sets a high standard for the succeeding volumes of the series.

An Index of Symptoms as a clue to Diagnosis. By RALPH WINNINGTON LEFTWICH, M.D. Third Edition. London: Smith, Elder, & Co.

WE readily grant that "the labour involved in the production and revisal of this little work has been out of all proportion to its size"—and would add, "to the value of the achievement." We regret that Dr. Leftwich has not put the capacity for taking pains which his index displays to a more worthy end. The book is an alphabetical catalogue of the causes of any given symptom; we have tested it carefully without discovering any omissions, and in doing so have found many unfamiliar terms defined. But, except perhaps to meet cross-examination of counsel, what does it serve to know that there are fifty causes of frequent micturition, and a hundred and one of "markedly raised temperature," that epistaxis occurs in acute yellow atrophy, ovarian disease, psittacosis, and fifty-four maladies besides, or that milk may be blue, green, red, or yellow. The book is intended to be used along with a dictionary of medicine, and the physician asking, "To what does this (unfamiliar) symptom point?" refers to the Index, then to the Dictionary. However ideal in theory, we doubt whether, in practice, such a plan would conduce to rational diagnosis.

RECENT ADVANCES IN MEDICAL SCIENCE.

MEDICINE.

UNDER THE CHARGE OF

A. LOCKHART GILLESPIE, M.D., F.R.C.P.Ed.,

MEDICAL REGISTRAR, EDINBURGH ROYAL INFIRMARY.

PLEURISY.

Barjon and Courmont (*Lyon méd.*, 1904, April 3) have studied the *variations in the outlines of pleural effusions* by means of radioscopy, in a series of cases at different periods in their evolution. They point out that some of the discrepant observations on the subject are due to the indistinctness of the upper limit of the shadow as compared with that of pneumonia, and to the fact that different observers have not always examined their patients in the same position. Radioscopy affords information as to—(1) The amount of the effusion and the degree of displacement of the mediastinum, (2) its mobility, (3) its variation, and (4) the completeness of recovery. The typical outline of the upper limit is a line passing obliquely from above downwards, and from without inwards. This curve, well known to clinicians, is simply explained by the writers thus:—The fluid at first collects at the lowest part of the pleural sac, and as it increases, raises the lung. Soon, however, the upward movement of the lung is checked mesially by the firmly fixed root, while laterally the organ remains free and allows the fluid to push it up and pass between it and the lateral aspect of the thoracic wall. Effusions may be divided into four groups: (1) Those below the root of the lung; upper limit horizontal; quantity, 200–400 c.c. (2) Those reaching the root; upper limit horizontal internally, sloping upwards and outwards in the external portion; quantity, 500–800 c.c. (3) Effusions above root; upper limit oblique from below, up and out; quantity, 1000–2000 c.c. (4) Effusions reaching apex; upper limit oblique or almost vertical; quantity, 2000–4000 c.c. The deviation of the mediastinum has been met with under two forms; most commonly the shadow is oblique, its lower part being most displaced, occasionally it is convex. Effusions are generally freely movable with the position of the patient; modification of their upper limits from coughing or forced respiratory movements were never observed.

The *urine in tuberculous pleurisy* has been studied by Courmont and Nicolas (*Lyon méd.*, 1904, July 3) with special reference to polyuria, hyperchloruria, and albuminuria in convalescence. The phenomena under consideration are believed to be due to the absorption of the toxic pleuritic fluid, and the therapeutic problems which they suggest are—(1) Ought absorption to be favoured or ought the pleura to be tapped? (2) does the albuminuria indicate any special treatment? (3) ought a salt-free diet to be given. The facts elicited are these: (1) During the febrile period of increase of the effusion the urine is diminished and the urinary chlorides low. When the fever disappears and the fluid begins to be absorbed, polyuria occurs and sometimes lasts for several weeks; at the same time the chlorides rise. At this time the ingestion of sodium chloride increases the effusion and the excretion of chlorides. (2) The body-weight falls during the first and rises during the second of those periods. (3) The urea excretion remains constant throughout. (4) Slight, transient albuminuria, unaccompanied by the presence of formed elements, is very constantly found during the absorption of the effusion. Koranyi is of opinion that these urinary phases are due to modifications of the circulation by the effusion, while the writers ascribe them to the direct action on the kidney of the absorbed effusion. During the acute onset the inflamed pleura fixes the chlorides, which contribute to form the effusion and probably to produce various antibodies; when convalesence is established the pleura gives up these, the fluid is absorbed, eliminated by the kidneys, which are irritated in the process, so that albuminuria is provoked. The therapeutic indication yielded by these results is that salt should be added freely to the diet at the outset of pleurisy, when the organism requires chlorides; it should be completely proscribed when the fluid is abundant or when hyperchloruria begins.

Abstinence from chlorides in the treatment of pleurisy with effusion forms the topic of a paper by Chauffard and Boidin in the *Gaz. d. hôp.*, Paris, 1904, May 3, in which the value of the "chloride test" and the *régime dechlorurée* is discussed. They quote several observations showing the baneful action of sodium chloride in 10–20 grm. doses in pleurisy—rapid increase of the effusion in most cases, febrile in one of these. Their experience, however, does not coincide with that of the preceding writers, for they find that chlorides are tolerated badly only during the acute stage; after convalescence has begun, they are well borne and rapidly eliminated. They think that the choice of a milk diet, into which very little chloride enters, at the onset of pleurisy, has a rational basis. With the idea of combating tuberculous effusions, Chauffard and Boidin made use of a salt-free diet containing quantities of raw meat juice, etc. They found, however, that it was badly tolerated, and that effusions did not clear up so quickly as on a mixed diet.

Humbert (*Arch. gén. de méd.*, Paris, 1904, June 14) had studied the *cells in malignant pleuritic effusions*. While, as a rule, the characteristic cells are easily found, they may escape detection for several reasons. (1) Introduction of the aspirator needle at too high a level, since the cells tend to gravitate to the lowest part of the pleural sac. (2) The effusion may be due solely to mechanical pressure by the tumour, in which case it contains only epithelial cells. (3) A secondary septic or tuberculous infection may determine the cytological formula, polymorphonuclear, or lymphocytic respectively. (4) If the malignant disease is of the lymphatic form, the pleural fluid contains only lymphocytes. This aspect of the question is the chief topic of the paper, in which a case of lymphatic cancer, erroneously diagnosed as pulmonary tuberculosis on account of the lymphocytic effusion, is described. The lymphocytes apparently differed in no way from those met with in tuberculous effusions.

Pleuro-typhoid—(Gaultier, *Arch. gén. de méd.*, Paris, 1904, July 26). This paper deals with the bacteriology and cytology of a pleural effusion in a man æt. 36, who suffered from anomalous typhoid fatally complicated by pleuro-pneumonia, which towards the end masked the abdominal symptoms and dominated the clinical picture. Fluid was withdrawn on three occasions. On the first it agglutinated Eberth's bacillus in a dilution of 1 in 20 (the blood did so in dilutions of 1 in 100); it gave a few cultures of the organism; it contained polynuclears, a few pleural cells, and numerous red blood corpuscles. On the second occasion it agglutinated in dilutions of 1 in 30; gave no growth on culture media; cells as before. The third sample agglutinated in dilutions of 1 in 20; gave a culture; contained the same cells. The noteworthy points are that the fluid does not lose its agglutinating power even though Eberth's bacilli can be grown from it; that the organism is not constantly, but intermittently present, as has already been pointed out by Widal; and that the cytological formula in this and other cases of typhoid pleurisy is, abundant polynuclears, some endothelial cells, and a fair number of red corpuscles.

"*Inequality of the pupils in diseases of the lungs and pleura*" is the subject of a paper by Deherain (*Presse méd.*, Paris, 1904, October 1). The symptom has been described in pneumonia, and attributed to a nervous disturbance associated with the vasomotor affection which causes the flushed cheek on the affected side. The writer, however, has noticed the mydriasis as frequently on the sound as on the diseased side. He has also observed the inequality of the pupils in three cases of acute bronchitis, and in eleven of emphysema complicated by chronic bronchitis. Among 120 patients suffering from pulmonary tuberculosis, who were observed for a month or longer, pupillary inequality was met with twenty-six times. He does not think that, as is asserted, apical phthisis is specially liable to cause mydriasis. The inequality may last for several months; the left pupil was the larger in fourteen, the right in twelve cases. There was no relation between the phenomenon and the side of the lesion. The sign has also been noticed in four cases of pleurisy. From post-mortem evidence Deherain believes that the pupillary inequality is due to the pressure of an enlarged gland in the mediastinum pressing on the sympathetic. The variable nature of the phenomenon would coincide with alternate swelling and regression of a tuberculous gland, and such an explanation is compatible with the absence of any relation between the affected side and the mydriasis. In pneumonia and emphysema a mechanical explanation is also probable.

Pneumococci in the blood in pneumonia (Kinsey, *Journ. Am. Med. Ass.*, Chicago, 1904, March 19).—The object of the investigation was to determine—(1) Whether pneumococci could be detected in the blood at any period of the disease, (2) with what frequency they occur, (3) the easiest method of finding them, and (4) their prognostic value. *Technique.*—Flasks of bouillon were inoculated with blood drawn from the basilic vein with the strictest precautions, and incubated at 37°. Fifty cases were observed. In the first series of twenty-five, from 8 to 9 c.c. of blood were used to 50 c.c. of bouillon; in the second series of twenty-five, the dilution was three or four times as great. Of the first series, only three gave positive results; one of these died, while of the negative cases half died and half recovered. In this series probably the proportion of blood to bouillon was so high as to inhibit growth in most cases. Of the second set, nineteen gave positive and six negative results. Kinsey believes that the pneumococcus can be found in the blood of every patient, negative results being due to unfavourable conditions of growth or faulty technique. While the mere detection of the organism has only a diagnostic and no prognostic bearing, to find the pneumococci in large numbers is of grave import.

Schiller's paper on the *Treatment of Empyema* (*N. Y. Med. Journ.*, 1904, June 18) is devoted to the relative merits of the conservative methods (of which Bülau's permanent aspiratory drainage is the type) *versus* resection of a rib. All methods—*e.g.* frequent puncture and irrigation—other than these were condemned at the discussion on the subject at the Congress of General Medicine, but no definite conclusion was come to as between these two. The advantages claimed for Bülau's method are: (1) Avoidance of pneumothorax, (2) simplicity, (3) smallness of wound and absence of shock, (4) narcosis not required. If the first of these be really the chief advantage of the proceeding, as its followers allege, the method may as well be abandoned, for pneumothorax occurring after resection concerns only a compressed lung, and does not embarrass respiration. Speaking of the conditions which facilitate expansion of the lung after evacuation of the pus, Schiller ascribes most inportance to the traction of adhesions between the parietal and visceral pleura. He also quotes, with agreement, experiments proving that the lung became expanded if the diameter of the fistula in the chest was smaller than that of the bronchus, and thinks, too, that dressings act as a valve favouring expansion. Total restitution to the normal condition probably never takes place after empyema. The disadvantages of Bülau's method are the long duration and complicated nature of the after-treatment, its uselessness in restless patients, and the liability of the tube to become blocked. Aspiratory drainage is, however, indicated in (1)—Double empyema, (2) acute cases with bad dyspnœa, (3) chronic cases with serious exhaustion, (4) where the requisites for the radical operation, especially for the pleural toilet, are lacking. Appliances whereby a very high negative pressure (120 mm. Hg) can be produced, have the supposed advantage of the complete removal of toxic material, but in Schiller's opinion this is outweighed by their complicated nature and the fact that the patient is compelled to remain in bed; sometimes they have to be discontinued on account of the severe coughing caused. Schiller favours resection of a rib, laying stress on a thorough pleural toilet, and getting the patient up early. In tuberculous empyema the treatment is based on the bacteriological findings. If the pus is sterile or contains only tubercle bacilli, simple puncture, followed by injection of iodoform-formol-glycerine, is advised. If there is a mixed infection, the empyema should be opened. Bülau's method should never be employed when the pus is sterile, on account of the impossibility of preventing mixed infection.

SURGERY.

UNDER THE CHARGE OF

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Aseptic Surgical Technique.

Three papers on "Aseptic Surgical Technique" were read before the American Surgical Association on 14th June 1904, and are published in the current number of the *Annals of Surgery* (Phila., 1904, October). In the first of these Ochsner of Illinois discusses the minimum requirements in a hospital in which the personnel of the operating-room is permanent. He lays great stress on the importance of this factor, as the responsibility rests on the "chief," and, with a permanent theatre staff, he is able to organise a method which he can rely upon being carried out, and, in the event of failure, may be able to localise the fault. The importance of *simplicity* in any plan adopted is insisted upon, as a complicated system is certain to contain elements which will not be fully comprehended by some member of the staff, with the result that mistakes are made and failure results. Another important factor is *uniformity* in the manner in which the system is practised. Any change made with the object of improving the method should be explained to all concerned. Above all, the system adopted should be *reasonable*, so that the less skilled assistants may comprehend its purport, and not merely carry out blindly a routine performance. The method of preparing the patient for operation adopted by Ochsner is that in general use in this country. He favours strong alcohol for the purification of the skin. As regards the disinfection of the operator and his assistants, he emphasises that the most important precaution for all engaged in surgical work is to keep the hands out of pus, and he insists that it should be impressed on everyone connected with surgical work that it is bad practice to soil one's hands with pus. Rubber gloves are used for suppurative cases. In his clinic, the assistant who has charge of patients primarily aseptic has nothing to do with patients who are not primarily aseptic. Strong commercial alcohol is largely used in the purification of the hands. Care is taken not to speak or breathe into the wound. Instruments are boiled for half an hour in soda solution. Dressings are disinfected in a steam steriliser, two hours being given for steaming and one hour for drying. (The pressure and temperature in the steriliser are not stated.) Drainage with a perforated rubber tube is always used in very large wounds. Irrigation is practically never used either in the abdomen or elsewhere. The author states, "My observations have convinced me that the only form of infection which must be considered in surgery is contact infection," and that the part of the system which is more frequently lame than any other is the purification of the hands. The fewer assistants directly connected with an operation the better. He handles the instruments himself, and only one nurse touches anything which comes into contact with the wound. The same nurse has assisted him in more than 5000 operations. She prepares all the dressings, sutures, and ligature materials; sterilises the instruments, supervises the preparation of the operating-room, and the patient on the day previous to the operation. She has three assistants, whom she instructs, but who do not come directly in contact with anything which comes in contact with the wound.

The second paper is by Monks of Boston. He prepares his materials in a steam autoclave, under a pressure of 15 lb. of saturated steam for half an hour, from the time the air has been completely driven out and the pressure gauge registers the 15 lb. pressure. The dressings, etc., must be loosely packed in the caskets. His absorbable ligatures he obtains from reliable dealers, whose entire business reputation rests on the sterility of the material they send out. He suggests, although he has not put it into practice, that the operating-room should be cleaned by the vacuum system, in place of by ordinary dusting. The fumigation of the operating-room with formalin gas is essential, at least after septic cases. All elaborate or ornate fittings and furnishings, giving the *appearance* of cleanliness, are luxuries of questionable value, if, indeed, they are not positive dangers, as they tend to give a false sense of security. Monks does not consider it necessary to prepare the patient's skin the day before the operation. He relies largely on washing with 70 per cent. alcohol on the operating table. The hands, after thorough mechanical cleansing, are soaked for two minutes in 70 per cent. alcohol. He advises the use of rubber gloves, and insists on the wearing of caps and masks at aseptic operations. The danger of speaking or coughing over a wound is graphically illustrated by the statement that, volume for volume, saliva contains more bacteria than sewage. The success of an aseptic system depends upon (1) belief in the aseptic idea; (2) fixed habits of asepsis; and (3) co-operation, or "aseptic team work."

In the third paper, Harrington of Boston suggests that some surgeons are inclined to overestimate the importance of small possible dangers, and to take more or less for granted absolute immunity from some others of greater magnitude. He is not without fear of infection from the air, in view of certain experiments he has made with Petri dishes; while he thinks that the danger of infection through the escape of droplets of sweat from a carefully prepared hand, through an accidental puncture of a rubber glove, is accorded undue weight. This opinion is also based upon experimental observations. The danger of infection through saliva he considers a real and serious one, as his experiments show that the average numbers of bacteria per droplet of saliva, as cast out in ordinary speech, is no less than 4375. In other respects the opinions and practiec of Harrington coincide largely with those of the other authors quoted.

OBSERVATIONS ON LOCAL ANÆSTHESIA IN OUT-PATIENT PRACTICE.

AULHORN (*München. med. Wchnschr.*, 1904, No. 35) has made a number of observations to ascertain how far the addition of adrenalin to solutions of cocain, etc., is of real use in inducing local anæsthesia. He follows Braun's nomenclature, and distinguishes infiltration anæsthesia and regional anæsthesia, meaning by the former infiltration of the operation area with a solution which acts on the nerve endings, and by the latter interruption of nerve conduction by injections round nerves or into nerves, proximal to the operation field. His observations were made on 763 operation cases in the Leipzig University policlinic. In 426 cases the direct infiltration method of Schleich was made use of, in 161 cases without, and in 265 cases with, the addition of adrenalin. It was found that the addition of adrenalin was of no special advantage, for in tissues which are suitable for infiltration the cocain solution alone acts perfectly well, while the well-known disadvantages of Schleich's method, notably the obscuring of anatomical details by the œdematous state of the tissues, are in no way lessened by the adrenalin. Further, when adrenalin is used there is some danger of reactionary hæmorrhage, and of necrosis of skin flaps and wound edges. In using Oberst's method for regional anæsthesia, Aulhorn prefers the older plan of using a tourniquet, instead of adding adrenalin to the cocain solution, because the tourniquet makes the operation field quite bloodless, which the adrenalin does not, and the anæsthesia is as perfect without as with adrenalin. In cases where there is no room to apply a tourniquet to the base of a finger or toe, the addition of adrenalin, as advised by Braun, is of advantage. Hackenbruch's plan of injecting the cocain solution circularly round the operation area was used in fifty-nine cases, and it was found that the addition of adrenalin was of very great value, for without it the method had hardly ever succeeded, while with adrenalin a 2 per cent. solution of cocain was found sufficient to produce complete anæsthesia. Braun's method of inducing regional anæsthesia was also extensively used, and the great value of adrenalin in its use clearly shown by the results obtained.

The use of adrenalin is attended by three possible dangers—first, if the dose is too high (according to Braun the maximum dose should not exceed 5 minims of a 1 to 1000 sol.) a certain degree of collapse with palpitation and frequent respiration may follow; secondly, its use may be followed by reactionary hæmorrhage, and sometimes by sloughing of flaps or wound edges. Aulhorn saw six cases of hæmorrhage and five of sloughing after the use of adrenalin, but in no case apparently were these complications at all serious, and their dependence on the adrenalin seems by no means clearly proved. Aulhorn concludes by giving directions for the efficient sterilisation of the solutions used in inducing local anæsthesia.

THE TREATMENT OF CHRONIC RHEUMATIC AND GONORRHŒAL ARTHRITIS BY BIER'S PASSIVE HYPERÆMIA.

LAQUEUR (*Berl. klin. Wchnschr.*, 1904, No. 36, S. 942) has, during the past year, made use of Bier's passive congestion treatment in a series of chronic rheumatic and other forms of arthritis. Bier's technique was followed exactly, the band being applied so as to make the limb swell and become dark red, while remaining warm. In most cases the congestion was kept up for two to four hours on the first occasion, the time being gradually extended on subsequent applications to twelve or even twenty-two hours. In cases of chronic rheumatic arthritis the effect of the treatment in relieving pain was very marked, the relief being apparent very soon after the treatment was begun. Marked functional improvement and diminution of swelling followed, and though in old-standing cases it is impossible by this, as by any other means of treatment, completely to cure the condition, a complete symptomatic cure often followed the use of passive congestion. Cases of ankle and wrist affection in particular showed excellent results. Cases of true arthritis deformans, on the other hand, showed little or no improvement under passive congestion, beyond a temporary relief of pain. In three out of five cases of gonorrhœal arthritis, treated in the same way, great improvement followed, and Laqueur's experience of the method leads him to say that passive congestion is a most valuable means of treatment, both in chronic rheumatic and gonorrhœal arthritis, either when employed alone or along with other methods.

A CASE OF SUTURE OF THE HEART, WITH RECOVERY.

STEWART (*Amer. Journ. Med. Sc.*, Phila., 1904, September) records an interesting case of successful suture of a wound of the left ventricle. The patient was a negro cook, æt. 20, who was stabbed in the chest with a rusty penknife. On examination, a small wound was found just above the third left rib, 1 in. from the sternal margin. The wound was surrounded by an emphysematous swelling, and bled continuously. The pulse was markedly irregular in volume and rhythm, about 80 per minute, the respirations about 40 to 45 per minute, after infliction of the wound. Under ether anæsthesia, a large musculo-cutaneous flap was turned outwards on the left side of the sternum, and it was found that the knife had entered the chest between the third and fourth ribs. The third and fourth ribs were then divided and turned back, disclosing a wound of the left pleura, the lung collapsed, and the pleural cavity full of clotted and fluid blood. Blood was spurting from a wound of the pericardium, three-eighths of an inch long. This wound was enlarged, and a penetrating wound of the left ventricle found, parallel to the long axis of the heart, and three-quarters of an inch long, being thus longer than the skin, pleural, or pericardial wounds. The cardiac wound was closed with a continuous silk suture. The pleural and pericardial cavities were then cleared of blood and the pleura irrigated. Gauze drains were left in both cavities. The patient remained in a serious condition for fourteen days after operation, the temperature, pulse, and respiration rate all being high, but he eventually made a complete recovery, and was allowed out of bed on the thirty-fifth day after operation. Two months after operation the wound was quite healed and the patient well, his pulse rate varying from 80 to 90 per minute.

Stewart has been able to collect sixty cases of operation for wounds of the heart, with the surprising recovery rate of 38 per cent. Of the recorded cases, fifty-five were stab wounds and five gunshot wounds. In fifty-seven of the cases the pleura was wounded as well as the heart. Of the external wounds, thirty-nine were on the left side between the second and seventh ribs, sternum and anterior axillary line, two to the right of the sternum, one in the epigastrium, one under the left costal arch, two in the left mid-axillary line, and in fifteen cases no mention of the site of the external wound was made. The left ventricle was wounded thirty times, with fifteen recoveries; the right twenty-one times, with seven recoveries; each auricle once, with a fatal result in each case; and in four cases no mention was made of the part wounded. The patients were operated on at times varying from less than an hour to more than twenty-four hours after injury, and it is interesting to note that of three cases operated on more than twenty-four hours after injury, two recovered. Stewart discusses the various methods of exposing the heart for suture, and concludes that in the majority of cases an osteo-plastic flap, with the base towards the sternum on the side indicated by the external wound, will be found sufficient. During suture the heart may be steadied by fingers, forceps, or sling sutures. Silk, catgut, and celluloid have all been employed as suture material with success. Failure to obtain an aseptic wound does not imply a fatal result, for in all of the recorded recoveries some form of infection was present. A full table of all the recorded cases of heart suture completes an interesting paper.

Medical and Surgical Considerations in Pyopericarditis, with Report of Cases.

Scott and Le Conte (*Am. Journ. Med. Sc.*, Phila., 1904, September, p. 447) report four cases of pyopericarditis complicating pneumonia, in three of which the pericardium was opened and the patients made a good recovery. In discussing the surgical aspect of the cases, Le Conte takes up the questions of exploratory puncture, of the best means of inducing anæsthesia in such cases, and of the relative merits of intercostal incision and resection of costal cartilages for obtaining access to the pericardium. As the result of observations on the cadaver, it was found that the width of the anterior mediastinal space at the fifth rib varied greatly, from 1 cm. to 8 cms., and that if the pleura is to be avoided, the best sites for puncture of the pericardium are the anterior ends of the fourth and fifth left interspaces as close to the sternum as possible. Le Conte holds that the adhesion between the left pleura and the triangularis sterni and the pericardium are so firm, that distension of the pericardium does not alter the pleural relations to the chest wall, and that therefore the supposition that a distended pericardium strips back the pleura from the chest wall as a distended bladder does the peritoneum from the abdominal wall, is a mistaken one. The general conclusions reached as the result of the clinical and anatomical observations of the two writers are as follows:—

1. Purulent pericarditis is quite frequently overlooked in lobar pneumonia and in other pyæmic states. 2. Its presence modifies the pre-existing disease to a considerable extent. 3. In diseases with high temperature the presence of purulent pericarditis depresses the fever

range and increases the respiratory and pulse rate without sufficient clinical evidence of trouble elsewhere than in the pericardium. 4. It is yet to be proved that the heart, in case effusion is present in the pericardium, is always dislocated backward and upward. It is probable that in some cases the presence of fluid in the pericardium dislocates the heart either to the right or to the left. 5. The diagnosis once made, the only treatment should be incision and thorough drainage. (Paracentesis will at times relieve temporary urgent symptoms, and should be performed without the slightest fear.) 6. That exploratory puncture can be made with safety, and is essential for diagnostic purpose before operation is undertaken. 7. That such puncture should be made in the fourth or fifth left intercostal space, as close to the sternum as possible, with a fine needle. 8. That pericardial dilatation does not alter the relations of the pleuræ to the anterior thoracic wall. 9. In the presence of pyopericarditis, the overlying pleural space is usually obliterated by extension of the inflammation. 10. That incision under local anæsthesia is the preferable operation in the majority of cases. 11. That Robert's chondro-plastic flap is preferable to an ordinary excision of costal cartilage when intercostal incision fails to give adequate drainage.

OBSTETRICS AND GYNÆCOLOGY.

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Local Anæsthesia in Gynæcology.

Webster (*Chicago Med. Rec.*, 1904, May) advocates the more frequent employment of local anæsthesia, especially in such cases as marked anæmia, nephritis, and cardiac disease. He uses Schleich's method, and by this means has performed plastic operations, and abdominal sections such as myomectomy, Cæsarean section, and resection of intestine. For the latter operations he infiltrates the skin, and uses no further anæsthetic.

Hysterectomy for Acute Puerperal Infection.

Cristeaneo (*Rev. de gynéc. et de chir. abd.*, Paris, 1904, No. 4) finds, from a collection of 137 records, a mortality of 63 per cent. Of these, ninety-eight cases were after labour, with mortality = 68·4 per cent., thirty-nine cases after abortion, with a mortality = 46·2 per cent. Of six cases of sloughing fibroid, three died; and in five cases where the operation of hysterectomy was performed for perforation of the uterus, all the patients recovered. In thirty-four cases there was retention of fœtal products, and of those nineteen died. In eighty cases of acute puerperal infection the mortality was 75·6 per cent., and the rate of mortality was higher when the infection followed full-time labour than that following abortion. The conclusion arrived at was, that as in cases treated by non-intervention the mortality does not probably exceed 10 per cent., operative interference by hysterectomy is unjustifiable.

The Blood in Pregnancy.

Thomson (*Johns Hopkins Hosp. Bull.*, Baltimore, 1904, June) made observations on twelve patients, the examinations being conducted at monthly intervals, 165 estimations being made on thirty-three separate blood examinations. The conclusions arrived at were as follows:—(1) The red blood corpuscles are diminished in the early months, in most cases becoming normal by the end of pregnancy. (2) Hæmoglobin likewise diminished during the first seven months. (3) A slight leucocytosis in every case of pregnancy. (4) Specific gravity is low at first, but rises to normal at full term.

Styptol in Uterine Hæmorrhage.

Witthauer (*Centralbl. f. Gynäk.*, Leipzig, 1904, No. 33) states that this preparation of cotarnin is an anodyne and sedative, and does not excite labour pains. Witthauer has found it specially useful in the menorrhagia of young girls where there is nothing found abnormal about the pelvic organs. Also at the menopause, hæmorrhages were checked which resisted other drugs, such as hydrastis and stypticin. It is given in tabloid form, is harmless, cheap, and is of most use in cases where there is no special indication to bring about uterine contraction.

Chorio-Epithelioma following Tubal Pregnancy.

Hinz (*Ztschr. f. Geburtsh. u. Gynäk.*, Stuttgart, 1904, Bd. iii. Heft I.) records the following case of this rare condition: P., æt. 33, multipara, complained of recurrent abdominal pain five weeks after the last menstrual period. Tubal abortion was diagnosed, and the sac removed by abdominal section. Microscopic examination of the right tube showed chorionic villi of the usual appearance. The patient had recurrent pain and bleeding, and a swelling on the right side of the uterus was detected six weeks after the first operation. This was supposed to be another ectopic gestation in the stump of the right tube, and was removed by a second cœliotomy. The patient died seven weeks later. The lungs and liver contained masses of tissue like blood-clot, which on microscopic examination were found to be typical chorio-epitheliomata.

LARGE OVARIAN CYST.

ZACHARIAS (*München. med. Wchnschr.*, 1904, August) records the following case: P., æt. 63, had noticed an abdominal swelling for twenty years. It reached to the level of the knees, its greatest circumference being 187 cms. The cyst was tapped and 60 litres of fluid evacuated. An attempt to remove the cyst failed, on account of dense adhesions to the anterior abdominal wall. The author refers to other cases previously reported.

THE NATURE OF THE INDICATION FOR THE REMOVAL OF FIBROID TUMOURS OF THE UTERUS.

NOBLE (*Amer. Med.*, Phila., 1904, September) gives a table representing the degenerations and complications in a series of 1188 cases of fibroid tumours. Especial attention is directed to the relative frequency of adeno-carcinoma of the uterine body as contrasted with epithelioma of the cervix. Noble thinks that, as a result of degenerative changes in this series of cases, 16 per cent. of the patients would have died without operation, while 18 per cent. would probably have died from complications, and if one includes the possible danger from pressure on important organs, he states that one-third would have died without operation. He believes that the surgical rule to remove a tumour when present holds good for fibroid tumours, and that the cases which do not require operative treatment are very small tumours, subserous development, and the presence of some condition of the patient which would contraindicate any operation.

THERAPEUTICS.

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PERNICIOUS ANÆMIA.

GRAWITZ holds that in pernicious anæmia we are dealing with a severe secondary degeneration of the red blood corpuscles associated with a marked regenerative activity of the bone marrow, and that this is caused by a toxic action on the erythrocytes. In the majority of the cases toxins are formed in the intestinal tract, which, on absorption, act as specific blood poisons in predisposed individuals. His aim in treatment is, therefore, to overcome the blood degeneration by preventing this toxin formation in the intestines. He relates five cases, occurring during the past year, in which such a course of treatment produced extremely good results. In the case of a woman with severe pernicious anæmia, there were numerous bad teeth and a history of inability to chew her food properly. The following plan was followed:—The mouth was kept acid, and oral feeding took the form chiefly of vegetables in purée form (potatoes, spinach, curds, rice), while bread was given spread with substances such as anchovy paste to stimulate the appetite. At first the stomach was washed out every day with lukewarm saline solution, and the patient was enjoined to drink large quantities of lemonade. Later the washing out was only done occasionally. The animal albuminous food was given by the rectum in the first stages. After a preliminary cleansing enema, twice a day an injection of ¼ litre of milk with barley water, sugar, egg, and plasmon was administered. Under this purely dietetic régime, without any drug medication, the patient rapidly improved, and put on 18 lb. in weight within five weeks. At the end of the third week, when the patient had already considerably improved, the nutrient enemata were stopped, and a more generous diet was given by the mouth. At the same time hydrochloric acid and Fowler's solution were used. The other four cases were treated on the same plan, with great improvement in the subjective condition and in the composition of the blood. Only one case ended fatally. The patient was apparently recovering from an enterogenic anæmia when tuberculosis of the peritoneum developed, with ascites and œdema, which proved fatal, without, however, materially affecting the blood condition.

As the result of these and similar observations, Grawitz concludes that the enterogenic origin of certain forms of pernicious anæmia is proved, and that for these cases the proper treatment is a rational intestinal regimen, which of itself is able to cure the whole train of symptoms and cause the disappearance of the histological changes of the blood.—*Deutsche med. Wchnschr.*, Leipzig, 1904, Nos. 30 and 31.

GLYCOSURIA AFTER MORPHIA.

It is well known that after poisoning with morphia a reducing body may appear in the urine. Luzzatto has investigated the nature and origin of this reducing body in a series of experiments on dogs and rabbits. He finds that in these animals large doses of morphia, either subcutaneously or intravenously, cause a temporary glycosuria, which passes off as the morphine action ceases. The glycosuria estimated with Fehling's solution represents from 0·2 to 0·6 per cent. of dextrose. The immediate cause of the glycosuria is a glycæmia. After giving morphia, the blood may contain as much as ten times the normal quantity of sugar. The diet had no particular action on the degree of reducing power of the urine, but a prolonged fasting state prevented the onset of the glycosuria. By careful habituation to morphia, the appearance of glycosuria may be avoided.—*Arch. f. exper. Path. u. Pharmakol.*, Leipzig, 1904, October.

SALICYLIC ACID.

SANTINI, finding that the peri-articular injection of sodium salicylate, according to Bouchard's plan, was only attended with moderate success, has introduced direct injections into the interior of the affected joints With most of the joints affected such injections are easy; only in the case of the hips, shoulders, and spinal articulations is it necessary to fall back on peri-articular injections. The dose varies according to the size of the joint. For the larger joints 5 c.c. of a 3 per cent. solution is possible, but, as a rule, smaller amounts, 3 to 4 c.c., are quite efficacious and cause less pain. In the majority of cases the injections are attended at first with an increase in the joint pain. As a rule, this is quite bearable, but in a few cases the pain is excessive. In most of the cases the injections are well borne, and in a few moments movement of the joints is either painless or much less painful than before. The effect of well carried out injections is permanent, and only exceptionally is there any return of pain.

Santini agrees with Bouchard that the local use of sodium salicylate as peri-articular, or, better, direct intra-articular, injection is a very powerful method of treating the manifestations of rheumatic fever.—*Wien. klin.-therap. Wchnschr.*, 1904, No. 36.

THE ACTION OF PURGATIVES.

MACALLUM gives in this paper the results of a long series of experiments on the action of purgatives, some of which have already been published in American periodicals. His investigations comprised three groups of purging drugs, namely, salines, vegetable purges (cascara and rhubarb), and alkaloidal substances, such as pilocarpine, which produce purgation after injection. The experiments were carried out on rabbits and dogs, and the action was tested in various ways—oral administration, intravenous and subcutaneous injections, direct application to the peritoneal surface of the bowel, and, lastly, by excising portions of the bowel and testing the effect of the drug after the circulation and the action of central nervous system had been completely eliminated. His results show that in the three classes of purges investigated the action is similar.

The most important discovery was made with the salines. The hitherto accepted theory is that these drugs act in virtue of the fact that they are absorbed with difficulty out of the intestines, and tend to accumulate round them the fluid of the secretions. The mere bulk of the fluid contents eventually acts as an irritant, causing evacuation of large quantities of fluid fæces. This explanation was questioned by Loeb, who found, in his experiments on muscles and nerves, that those salts which increased the excitability of nerves and muscles were exactly the same salts which produced purgation. He therefore suggested that these salts acted as purges in virtue of the increased irritability produced in the intestinal muscular and nervous tissue, which caused peristaltic movements leading to freer purgation.

This view Macallum has been able to prove. He finds that those drugs which, when introduced into the stomach or intestine, cause purging, produce the same action when injected into the skin or directly into the blood. In the case of the injections the action is more prompt, and obtained with smaller doses. Direct injection of 1 to 2 c.c. of $\frac{m}{8}$ sodium citrate solution into the blood causes an almost immediate increase of peristalsis. Subcutaneous injection is somewhat slower, and oral administration requires several minutes before a similar effect is seen. Not only is the peristalsis increased, but there is also a distinct increase in the amount of fluid secreted into the bowel after subcutaneous or intravenous injections. The same effect is produced by applying the solution to the peritoneal covering of the bowel. The most active salt in all these applications seems to be barium chloride. Another series of experiments showed that the action produced by the saline purgations could be completely checked by calcium chloride or magnesium chloride. A similar action can be shown on pieces of gut removed from the body and immersed in solutions of the various salts. The purging salts in suitable concentration cause increase of peristalsis and secretion, while the addition to the solution of $CaCl_2$ completely inhibits this action.

Macallum claims that his experiments show that the salines only act after being absorbed into the blood. The action does not depend on the fact that they are re-excreted into the intestine, since direct introduction into the bowel is slower in producing peristalsis than subcutaneous injections.

The chief factor in the production of the semi-fluid stools is the increase of secretion which the salines produce. There is a double effect—increase of peristalsis and increase of secretion. The increased peristalsis is due to increased irritability of the muscular fibres, possibly also of the nerves.

He further finds that the action of rhubarb and cascara is similar. Dried extract of cascara dissolved and neutralised in $NaHCo_3$ solution caused increased peristalsis and secretion, whether injected into the blood, subcutaneous tissue, or directly applied to the peritoneum. The antagonistic action of $CaCl_2$ is not so marked. It is transient and passes off in four or five minutes. The antagonism between pilocarpine and calcium chloride was still less marked.—*Arch. f. d. ges. Physiol.*, Bonn, 1904, September.

DISEASES OF THE EYE.

UNDER THE CHARGE OF
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Influence of Changes in the Circulation upon the Intra-ocular Pressure.

One of the two authors of this interesting contribution to the physiology of the eye was engaged upon an inquiry into the amount and composition of the intra-ocular fluids, and found himself much hampered by the uncertainty which existed as to the relation between blood pressure and intra-ocular pressure; the two, Henderson and Starling, therefore undertook together an investigation into this difficult point. This seemed to be all the more necessary, that previous writers who have attacked this problem from various points of view are by no means at one in their conclusions, indeed, in some instances, are diametrically opposed. All, however, seem to agree so far that intra-ocular pressure, in the absence of local disturbing agencies, follows more or less closely the variations in general blood pressure. Our two authors confirm this: they find that the intra-ocular pressure varies directly with the blood pressure in the intra-ocular vessels; it rises and falls with the arterial blood pressure, and is not materially influenced by alterations of pressure in the great veins.

What is the relation of the sympathetic to the intra-ocular tension? Stimulation of the vaso-constrictor fibres which travel to the eye by the sympathetic causes constriction of the vessels of the iris and ciliary body, as can be readily shown in the rabbit for example; division of these fibres has, however, an effect which is very transitory, a point of importance when the question of the value of sympathectomy in glaucoma has to be considered. In their studies of the influence of the sympathetic, the authors met with a somewhat subtle source of error, which had to be carefully guarded against, namely, that the sympathetic supplies twigs to the unstriped muscle of the orbit, contraction of which might possibly compress the globe and in this way raise the tension and vitiate the results of an experiment. Thus it may happen that (in a dog, say) stimulation of the sympathetic gives rise to no alteration of general blood pressure, but definitely raises the intra-ocular blood pressure; the tension then gradually falls off. Noticing that the nictitating membrane in such a case was active, it occurred to the authors that this action of the stimulated sympathetic upon the unstriped muscle might have caused the rise in tension. The constriction of blood vessels, which is also a result of stimulation of the sympathetic, comes on much more slowly; as a result of the diminution of the supply of blood, the intra-ocular tension slowly falls, since less fluid is exuded into the eye. Stimulation of the peripheral end of the divided fifth nerve causes a rise of pressure which is occasioned by contraction of the unstriated muscle of the orbit; this rise does not occur if the fibres running into the Gasserian ganglion from the sympathetic are not in a normal state; thus no such rise of pressure is manifested if the superior cervical ganglion has previously been excised. Unlike some previous investigators, the two authors came to the conclusion that the nerve contained no secretory or vaso-dilator fibres belonging to the eye, for when they applied stimulus to the peripheral end of the cut nerve there was no alteration of blood pressure, though the intra-ocular tension rose at once, and, after remaining up for some time, gradually fell again. In order to eliminate any effects which might be due to stimulation of sympathetic fibres included in the nerve, they then excised the superior cervical ganglion, and, after waiting for a period long enough to ensure degeneration of the fibres running from that ganglion to the nerve, again applied the stimulus; this was attended by no sympathetic effects, of course, such as movement of the nictitating membrane and dilatation of the pupil, which had been present before, and by no rise at all in intra-ocular tension whatever.—*Journ. Physiol.*, Cambridge and London, vol. xxxi.

ADRENALIN IN GLAUCOMA.

THERE have been many claims made on behalf of adrenalin, some of which have been substantiated and others abandoned; one of the latest urgent claims is put forward by Grandclément, to the effect that adrenalin is capable of definitely curing glaucoma. The case which first raised in his mind the idea that this was possible was that of a young man, not suffering from glaucoma at all, but from a persistent hyperæmia of the conjunctiva. There was not the slightest increase in intra-ocular tension, and it was not from any intention to lower this that he was given adrenalin, but solely for the sake of its power of reducing hyperæmia. After a time the patient began to complain of failure of vision, and on examination it was found that his ocular tension was very low. The use of the drug was at once discontinued, but it was fully six months before vision had returned to its former standard and the tension risen to normal. Arguing from this case, Grandclément considered it not improbable that if adrenalin was able so markedly to lower normal tension, it was capable also of reducing increased tension, and determined to give it a fair trial in the next suitable case which fell into his hands. Presently he met with a patient in whom it seemed probable that this treatment would do good,—a woman of 37, who exhibited all the classical features of subacute glaucoma, following upon a series of premonitory attacks. As she absolutely refused to undergo operation, which at first he suggested, he was able with a clear conscience to put his theory to the test. But before doing so he thought it right to try what eserine could accomplish; he therefore used the myotic alone and vigorously for thirty-six hours, but without the smallest result. He then instilled every half-hour drops containing both eserine and adrenalin. In two hours pain was lessened; in ten hours hand-movements could be perceived; in twenty-four hours the patient could have guided herself with the affected eye alone; on the third day the tension was again normal, and in a week vision was two-thirds of normal. On account of a tendency for recurrence to take place, it was thought better to continue the drug in diminished quantities for some weeks; for a month there were threatenings of relapse, but by the end of a week vision had risen to two-thirds of normal, at which high standard it remained at least for some months. Grandclément is very much impressed by the lessons which he has derived from this case, and urges that in all cases which are at all suitable this method of treatment should be adopted. As will be seen immediately, however, he does not consider old-standing cases as coming within that category. Even in the less classical forms of glaucoma he advocates the use of adrenalin and eserine in combination; he has employed them with advantage in buphthalmos and in secondary glaucoma. In any case, however, especially in any case of pure glaucoma, he lays down four axioms in regard to the value of these drugs. These are—(1) That the glaucoma must be recent; there must, in other words, be no organic changes in the tissues, and particularly in the parts about the angle of the anterior chamber. (2) That the adrenalin must be instilled into the eye every half-hour without any intermission whatever for perhaps three days, until the tension has gone down. (3) That eserine and adrenalin must be used together; the former acting by keeping the pupil small and the angle open, the latter by diminishing the hyperæmia and hypersecretion of the ciliary body, thus combating both the principal elements in the causation of glaucoma. (4) That the employment of adrenalin must cease, or at least be diminished, so soon as the tension becomes lowered to normal, lest a permanent condition of hypotonus should be established. The action of adrenalin, though transitory, is powerful, and it is capable, if employed too long, of causing a disease of arteries resembling atheroma; indeed, one of the current theories regarding the causation of atheroma is that it is caused by an abnormal activity of the suprarenal bodies.—*Clin. opht.*, Paris, 1904, October 12.

CRYOSCOPY AND THE PATHOLOGY OF SENILE CATARACT.

THERE has been for a very long period, perhaps there has always been, a strong impression that some relation exists between cataract and some pathological condition or another of the urine. It is not merely that cataract is relatively frequent in diabetes; the impression, as I have called it, is that even the ordinary non-diabetic cataract is related to some such condition. Hitherto, however, facts have been very meagre, and in truth no one has been able to discover any constant, or even any one frequent abnormal constituent, or the absence of any normal constituent. Recently, however, Grilli (Rome) has attacked the question anew from the point of view of cryoscopy, and has examined all the patients suffering from cataract during a certain period in Parisotti's clinique. The grosser alterations in the urine noted in the first place were low specific gravity, a relatively increased flow, and comparative freedom from sedimentary deposits. The urine was then examined by cryoscopy when the osmotic tension was found lowered, Δ being on an average about $-1{\cdot}10$. This suggests defective excretory power in the nephritic tissue, which may be due to partial atrophy of the kidney, to a chronic interstitial nephritis or sclerosis of the kidney. Arteriosclerosis has, of course, been for many years known to be in some cases a concomitant of cataract, whether it be general or merely local, and atheroma of the carotid arteries, though by no means palpably present in all cases, is at least a very frequent accompaniment. It must be kept in view also that arterio-sclerosis, when present, is not of necessity uniformly distributed by any means; it may affect the liver in any patient and leave the kidneys untouched, for example. It is, therefore, not a sufficient answer to the suggestion to point out that cataract attacks by no means all of those who suffer from arterio-sclerosis. Grilli considers, as a result of his investigations, that the crucial point is the affection or the freedom of the kidneys.

Some writers have described a condition which they call senile kidney, which may be a manifestation of arterio-sclerosis attacking that organ; in this the proportion of urea and of other effete matters is unduly low. This is met with in old persons who are not affected by cataract, but to a less degree, according to Grilli, who thinks that this condition fairly well represents the pathological condition to which he ascribes cataract.

It is the view of certain writers that the nourishment of the lens depends principally upon the physical process of diffusion, while others consider that it is largely if not completely dependent upon the more organic, the more vital, process of osmosis. If this view be correct, then it follows at once that an alteration in osmotic tension must prove a very important factor as regards the sufficient or insufficient nutrition of the lens. Indeed, if we assume that the osmotic tension of the blood is raised in a given person, that of the lymphatic and intra-ocular fluids will be raised also; the effect of this upon a lens may be the withdrawal of fluid from it to pass into (say) the aqueous. Now this is exactly in accord with what Peters and Troncoso assert, namely, that the aqueous humour of an eye affected with cataract possesses an amount of diffusible substances in excess of the normal; the effect of this must be to dehydrate the lens. The fluid filling the vacuoles which have been described as existing in the cataractous lens is regarded by Grilli as fluid on its way from the fibrillary substance to escape into the aqueous humour by way of osmosis. This is true also of the cataract of the glassblower and of the cataract of the diabetic, where a similar explanation seems to be most satisfactory. The cycle of events may thus be summed up: a low osmotic tension of the urine; a high osmotic tension of the blood and lymph fluids (including the aqueous humour), with deficient excretion; the lens thus forced to yield up water becoming cataractous in consequence.—*Rec. d'opht.*, Paris, 1904, June.

REPORTS OF THE MEDICAL SOCIETIES.

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EDINBURGH MEDICO-CHIRURGICAL SOCIETY.—*November* 2, 1904.—Professor CHIENE, C.B., President, in the chair.—Mr. CATHCART showed—(1) A patient after operation for fæcal fistula; (2) a patient suffering from scirrhus erythema after removal of both mammæ for scirrhus.—Mr. ALEXIS THOMSON showed—(1) A boy, æt. 15, after nephropexy for floating right kidney; (2) a woman, æt. 27, after conservative operation for hydronephrosis; (3) a case of popliteal aneurysm treated by excision of the sac after failure to cure by proximal ligature.—Mr. SCOT SKIRVING read a paper entitled "Questions regarding the Sterilising of Dressings." He first referred to the differences of opinion which existed regarding the sterilising value of steam when under pressure and when not under pressure. It was pointed out that steam under pressure was not necessarily superheated, since, as long as there is some water vapour present, the steam has the temperature of boiling water. Bacteriological experiments, conducted by himself and by other observers, had proved that superheated steam was not so good a sterilising agent as saturated steam at 100° C. Some observers prefer to use this saturated steam at ordinary atmospheric pressure, others to use it under pressure of one or two atmospheres. The presence of air in sterilisers is a serious drawback, for the reason that it is a bad germ-killer and a bad conductor of heat. Mr. Skirving next referred to the drums in general use, and pointed out that these were unnecessarily complex in structure, and thus apt to get out of order. The dressings also were frequently packed far too tightly to allow the steam to penetrate to the centre. He next described a drum which he had devised. It consists of an inner framework of wire and an outer metal box, in which there is only one set of holes, near the top. The cover fits tightly, and so seals the holes; it is kept loosely fitting while sterilising is being carried out. The drum is placed upside down in the steriliser, so that the steam enters from below, experience having shown that this gives a better result than that got by allowing the steam to enter from above. He concluded by urging the necessity of testing, bacteriologically, the efficiency of the steriliser from time to time.—Dr. Melville Dunlop read a paper on "Syphilitic Synovitis in Children," which will appear in the Journal.—Dr. Chalmers Watson read a paper on "Gout—our Present Position as to its Etiology." He pointed out that Garrod's teaching as to uric acid being the primary factor in the disease, had of late years been questioned by clinicians. His own investigations had led him to abandon the view that uric acid is an important etiological factor, the steps leading to this being shortly as follows:—(A) *Chemical.*—(1) Uric acid is found in excess in the blood in a number of diseases having no known relation to gout, leucocythæmia for example; (2) an analysis of the urine in acute gout showed that there was no disturbance of uric acid excretion either before, during, or after the paroxysm. (B) *Histological.*—The histological appearances observed in (*a*) gout in the lower animals, and (*b*) chronic gout in man, do not support the uric acid theory, but rather suggest an infective condition. (C) *Clinical.*—A study of the features of an acute attack—the mode of onset, the temperature record, the changes in the blood indicating disturbance of the marrow function—suggests the operations of an infective agent. The general conclusions he had come to were that uric acid is not an important factor in the production of gout, but that there is an infective agent in the disease. The uric acid is the feature that gives the inflammation its specific character. According to this view, the source of the infection is the alimentary canal, and an injudicious dietary acts mainly in virtue of its influence on the bacteria normally present in the digestive tract. He concluded by suggesting that in future investigations on the subject attention should be paid to the influence of certain diets on the digestive fluids, and that some of the classical experiments on gout should be repeated with the aid of skilled bacteriological methods.

Edinburgh Obstetrical Society.—*November* 9, 1904.—Dr. Brewis, President, in the chair.—Dr. Brewis delivered his presidential address, which will appear in an early number of the Journal.—D. J. W. Ballantyne read a "Note on a Hydrocephalous Infant, delivered by Spinal Tapping." The case was a breech presentation, and the difficulty in labour was due to the after-coming hydrocephalus head. In order to expedite delivery, he performed spinal tapping, and so emptied the distended cranium. The operation proved most successful, and Dr. Ballantyne pointed out the advantages of the operation over perforation of the after-coming head.—Dr. RANKEN LYLE read "Notes on an interesting Case of Cæsarean section at term." Labour was obstructed by a hard mass in the pelvis. Cæsarean section was performed, and the uterus removed. It proved to be a double uterus, one-half having contained the fœtus, while the other was the seat of a fibroid tumour, which had caused the obstruction to labour. At a later examination, it was found that the vagina was also double.

GLASGOW MEDICO-CHIRURGICAL SOCIETY.—*November* 4, 1904.—Dr. M'CALL ANDERSON read notes on—(*a*) A case of tuberculous peritonitis treated with tuberculin. The patient, a boy, æt. 8, was admitted to hospital with a history of diarrhœa and swelling of the abdomen of two months' duration. The abdomen was tense. There was tenderness in the umbilical and hypogastric regions, and there was free fluid in the abdomen. After two injections of tuberculin, the temperature rose above 103° F. Altogether, sixteen injections of tuberculin were administered. When the patient left hospital, the abdomen was soft and free from tenderness and contained no fluid. (*b*) A case of Addison's disease treated with tuberculin. The patient, a married woman, æt. 39, was admitted to hospital complaining of severe pain in the back on the smallest exertion, headache, and fainting. The skin was deeply pigmented. Breathlessness and palpitation were prominent symptoms. Anæmia was extreme. After eight injections of tuberculin the pigmentation had almost disappeared, and the blood condition had improved greatly. The patient was so well at this time that she refused to remain longer in hospital.—Dr. DAVID NEWMAN described—(*a*) A case of movable left kidney with acute hydronephrosis from twisting of the ureter. The patient, a female, was admitted to hospital on the 17th October, with a history of pain in the lumbar region of five weeks' duration, greatly increased during the last week. During this latter period also no urine had been passed. The patient had a dry tongue and a rapid pulse. For two days after admission no urine was found in the bladder on passing the catheter, but on the morning of the 19th October 8 oz. were drawn off, and in the evening 20 oz. According to the patient's statement, no urine had been passed for nine days. On the 25th October the kidney was explored, and although all the urine from the left kidney was passing by the wound, 80 oz. were passed per urethram in the course of the day. The patient made a good recovery. (*b*) A case of movable right kidney with onset of symptoms characterised by marked respiratory and digestive disturbance. When the kidney became displaced the patient was subject to attacks of rapid breathing (80 respirations per minute). Respiration again became normal when the kidney was replaced. An attack of perinephritic inflammation came on and fixed the kidney. (*c*) A case of tuberculous disease of bladder and prostate with abnormal insertion of ureter, which contained an impacted calculus.—Dr. J. LINDSAY STEVEN described a case of acute pneumococcic pleurisy in which the symptoms closely resembled those of acute pneumonia. On the sixth day of the illness a pint of opaque yellow fluid was removed from the chest. This fluid contained Fränkel's pneumococcus in abundance. The case ended fatally.

Glasgow Pathological and Clinical Society.—*November* 14, 1904.—Professor **Muir**, President, occupied the chair and delivered the presidential address, on "The Defences of the Body in Disease." These were grouped under two heads—(*a*) Microscopic, namely, phagocytosis—the activities of certain cells, especially the polymorpho-nuclear leucocytes and the large hyaline and giant cells of the tissues, which destroy microbes by ingesting and then digesting them; (*b*) the ultramicroscopic, present in the fluids of the body, and exercised by substances the composition of which is unknown, and the presence of which is recognised neither by microscopic nor by chemical tests, but by their effects on bacteria or their toxins—antibacterial and antitoxic substances. These defences are normal functions of the organism, and are capable of great exaltation in response to the stimulus of invasion. Professor Muir illustrated his address by lantern demonstration of phagocytosis, leucocytosis, and emigration of the leucocytes, and proliferative changes in the bone marrow. The actions of agglutinins, precipitins, and lysins were demonstrated by test-tube experiments. Professor Muir concluded by considering the relations between the two classes of defensive forces, referring specially to Wright's discovery of opsonins, bodies in the serum which affect bacteria in such a manner that they become capable of being taken up and destroyed by the cells, and to the problem of determining where and by what cells the antibodies are formed.

Forfarshire Medical Association. — *November* 3, 1904. — Dr. **Duncan** in the chair.—Mr. **Greig** showed a boy who had suffered from tuberculous osteomyelitis of the humerus, for which the whole shaft of the humerus had been excised. In three to four months a new shaft was formed. Ten weeks ago, when he had regained the use of the arm, he fell and fractured his new humerus in the middle of the shaft. Firm union was obtained at the end of six weeks.—Dr. **George Miller** (in Dr. M'Gillivray's absence) showed a man with emphysema of the right lower eyelid, which was easily produced by blowing the nose. It subsided very quickly, showing that a fairly large opening existed in the nasal duct.—Dr. **Rogers** showed a photograph of a child with an enormous occipital meningocele.—Dr. **Buist** showed photographs of two abnormal mammary conditions—(1) Very marked hypertrophy, (2) supernumerary mammæ in axillæ. — Mr. **Greig** showed stereoscopic photographs of two cases of warty epithelioma.—Professor **Kynoch** exhibited and demonstrated an interesting collection of specimens, including three cases of extra-uterine pregnancy, three cases of tubo-ovarian cysts, and a dermoid ovarian cyst, removed at the seventh month of pregnancy.—Mr. **Greig** showed the skull removed from a boy, æt. 15, who had suffered from extensive lupus and tuberculous disease of bone.—Dr. **Halley** read notes of a case of chronic intestinal obstruction.

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MEDICAL EDUCATION IN THE UNITED KINGDOM.

I. EDUCATION IN GENERAL.

BEFORE describing the requirements imposed upon all those who desire to obtain a degree or diploma with the right to practise medicine and surgery, a word may well be said about the important questions—Which degree or diploma to work for? and which teaching institution to attend? There are three courses open to the aspirant to medical honours. He may enter a university which affords education as well as confers degrees; he may study at certain medical schools, and take his degree at a university which does not possess a teaching staff; or he may enter for one of the licences to practise granted by certain medical bodies. A university degree has certainly greater credit associated with it, but now that a minimum course of study, lasting for at least five years, and including a large number of compulsory classes, has been made obligatory upon all graduates and licentiates alike, the difference between the instruction provided by the universities and by the different medical schools is not so great as formerly.

The usual sum for the class and degree fees spread over the five years is about £150 to £160, when necessary extras are included. The table on the following page gives approximately the minimum cost of obtaining the different degrees and diplomas.

The fees at the different London hospitals can be compounded for by one or two payments, the sum of which is less than the total if paid by annual instalments. The curriculum for the London Colleges' diplomas costs from £110 to £158, exclusive of the examination fees. Several of the London Colleges give substantial rebatements to sons of registered medical men. If the London University M.B. course is taken, the cost is somewhat greater. The degrees of the Scottish Universities cost, with the examination fees, from £115 to £145; the licence of the Scottish Colleges, from £115 to £130.

Through the munificence of Mr. Andrew Carnegie, the cost of academic training has been lessened by the payment of the educational fees in the case of students of Scottish nationality, and also of those who have attended at any scholastic institution under the inspection of the Scotch Education Department, of whatever nationality, during at least two years after the age of 14, provided application be properly made for the same. Mr. Carnegie has given £2,000,000 as capital for a fund for this purpose, the interest to be employed as above, in the hope that only those who require help will apply, although no questions as to circumstances are asked from any claimant.

The Carnegie Trust for the Universities of Scotland is controlled by an Executive Committee, with chambers at 14 Hanover Street, Edinburgh. Forms of application, either for university or extramural students, may be obtained by writing to the Secretary at the above address.

TABLE I.—*The Approximate Cost of Curricula.*

	Diplomas.	Class Fees.	Examination Fees, etc.	Total.
1. TEACHING UNIVERSITIES.				
Edinburgh	M.B., Ch.B.	£115 0	£28 7	£143 7
Glasgow	M.B., Ch.B.	97 13	28 7	126 0
Aberdeen	M.B., Ch.B.	90 0	23 2	113 2
Dublin	B.A., M.B., B.Ch., B.A.O.	207 12	27 0	234 12
Durham	M.B.	115 0	26 0	141 0
”	M.B., B.S.	115 0	31 0	146 0
Victoria University	M.B., Ch.B.	138 6	17 0	155 6
Birmingham	M.B., B.Ch.	148 19	21 0	169 19
Oxford	B.A., B.M., B.Ch.	165 0	30 0	£165–£220
Cambridge	M.B., B.C.	150 0	20 0	£150–£200
2. NON-TEACHING UNIVERSITIES.				
London	M.B., B.S.	£150 0	£17 0	£167 0
Royal, Ireland	M.B., B.Ch., B.A.O.	145 0	17 0	162 0
3. LICENSING BODIES.				
Conjoint Scottish Qualification	L.R.C.P.E., L.R.C.S.E., and L.F.P.S.Glasg.	£90 0	£30 0	£120 0
Conjoint English Qualification	L.R.C.P. Lond., and M.R.C.S. Eng.	£90–£120	36 15	£126–£156
Society of Apothecaries	L.S.A.	£90 0	15 0	£105 0
Conjoint Irish Qualification	L.R.C.P.I., and L.R.C.S.I.	135 0	42 0	177 0
Apothecaries' Hall	L.A.H.	90 0	22 1	112 1

At the provincial medical schools in England the expenses for the London Colleges' diploma are about the same sum at University College, Sheffield; £123 at University College, Bristol; £125 at the University College, Liverpool. For the London University degree, £25 will require to be added to cover the fees for classes necessary for the Preliminary Scientific Examination.

In Ireland, the Dublin University only confers the M.B., B.Ch., B.A.O. degree on Bachelors in Arts; the cost therefore is considerably higher than elsewhere. The expense incurred while working for the Irish diplomas comes to about £140 in Dublin, but is much less than this at any of the Queen's Colleges, whether at Belfast, Cork, or Galway. The degree of the Royal University of Ireland costs £165 at the Catholic University School of Medicine in Dublin; the diploma of the conjoint colleges, £166.

The fees for lectures and examinations, therefore, vary from about £115 to £200; and, adding the cost of books, instruments, and club subscriptions for the five years, say £30, and of maintenance during thirty-nine weeks each year, £300, we get a total expense, solely connected with the curriculum, of from £445 to £530. This estimate is the utmost minimum; in most cases a sum of £1000, or over it, will be spent in the five years.

II. THE REGULATIONS OF THE GENERAL MEDICAL COUNCIL, BINDING ON ALL THOSE ENTERING UPON THE FIVE YEARS' COURSE OF MEDICAL STUDY, CONSTITUTING THE MINIMUM COURSE ALLOWED FOR GRADUATION OR LICENCE.

A. *Preliminary Examination and Registration.*

Before any one can register as a medical student, from which the commencement of his five years' course is calculated, he must pass a preliminary examination in the subjects of general education, or an examination recognised by the General Medical Council as equivalent to it. (Cf. Table II., pp. iv.–vii.)

A preliminary examination certificate is only accepted by the Council as entitling to registration, provided that it certifies that all the required subjects have been passed at one and the same time.

The student now enters his name on the books of a university or college, receives a certificate to this effect, and forwards the certificate, along with that for the preliminary examination, and a form of application for registration in the books of the General Medical Council (to be obtained from the registrars of the Council), filled up according to the instructions printed on it, to the registrar of the Branch Council for the district in which his school is situated. If this is not done within *fifteen days* from the commencement of a session, the classes taken during that session will not be recognised as qualifying for graduation. (For the names and addresses of the registrars, see p. xxiii.)

B. *Professional Education.*

The student is now officially recognised as having commenced the professional study of medicine, and is required to spend at least five years over it, of which the last year must be devoted to clinical work. Before he can enter for any of the examinations, he must produce certificates, not only to show that he has attended the necessary classes, and paid the necessary fees, but that he has given satisfaction to his teachers by his conduct, and taken part in the class examinations held during the sessions. The minimum attendance on classes which constitutes an *annus medicus* is fixed at two courses of lectures during each session, or one course of lectures and hospital practice.

Graduates in Arts or Science of any university recognised by the Medical Council, who shall have spent a year in the study of physics, chemistry, and biology, and have passed an examination in these subjects for the degrees in question, shall be held to have completed the first of the five years of medical study.

TABLE II.—*List of Examining Bodies whose Examinations in General Education are recognised by the Medical Council as qualifying for Registration as Medical or Dental Student.*

Testimonials of proficiency granted by educational bodies, according to the subjoined list, will be accepted by the Council, which reserves the right to add to or take from the list.

A Degree in Arts of any university of the United Kingdom, or of the colonies, or of such other universities as may be specially recognised from time to time by the Medical Council, is considered a sufficient testimonial of proficiency.

I. UNIVERSITIES IN THE UNITED KINGDOM.

Universities of Oxford, Cambridge, and Durham :—

(1) Junior Local Examinations (certificate to include all the required subjects at one time).
(2) Senior Local Examinations (certificates to include the required subjects).
(3) Responsions (certificate to be supplemented by others showing that the required mathematical subjects have been passed). Oxford.
(4) Moderations (certificates to include the required subjects). Oxford.
(5) Final Examination for a Degree in Arts.
(6) Higher Local Examinations (certificates to include the required subjects). Cambridge.
(7) Previous Examination (certificates to include the required subjects). Cambridge.
(8) General Examination (certificates to include the required subjects). Cambridge.
(9) Examination for Certificate of Proficiency (certificate to include all the required subjects at one time). Durham.
(10) Preliminary Examination in Arts for Graduation in Medicine and Science (certificate to include the required subjects). Durham.

Universities of London, Birmingham, and Wales, and Victoria University:

(11) Matriculation Examination (certificate to include the required subjects). London.

(12) Final Examination for a Degree in Arts or Science. London, Wales, Victoria.

(13) Preliminary Examination (certificate to include all the required subjects at one time). Victoria.

(14) Entrance Examination in Arts (certificate to include all the required subjects at one time). Victoria.

(15) Matriculation Examination (certificate to include all the required subjects at one time). Birmingham, Wales. Birmingham also has 1, 2, 3, 7, *supra.*

Universities of Edinburgh, Aberdeen, Glasgow, and St. Andrews:

(16) Junior Local Examination (certificate to include all the required subjects at one time). Edinburgh and Aberdeen.

(17) Senior Local Examination (certificates to include the required subjects). Edinburgh and Aberdeen.

(18) Preliminary Examination for Graduation in Medicine and Surgery (certificate to include the required subjects).

(19) Preliminary Examination for Graduation in Arts or Science (certificate to include the required subjects).

(20) Final Examination for a Degree in Arts or Science.

(21) Final Examination for the Diploma of L.L.A. St. Andrews.

University of Dublin:

(22) Public Entrance Examination (certificate to include the required subjects).

(23) Examination for the First, Second, Third, or Fourth Year in Arts (certificate to be signed in the approved form by the medical registrar of the university).

(24) Final Examination for a Degree in Arts.

Royal University of Ireland:

(25) Matriculation Examination (certificate to include the required subjects).

(26) Final Examination for a Degree in Arts or Science.

Oxford and Cambridge Schools' Examination Board:

(27) Lower Certificate (to include all the required subjects at one time).

(28) Higher Certificate (certificates to include the required subjects).

II. MEDICAL LICENSING BODIES.

Royal Colleges of Physicians and Surgeons in Ireland:

(29) Preliminary Examination (certificate to include all the required subjects at one time).[1]

III. EDUCATIONAL BODIES OTHER THAN UNIVERSITIES

College of Preceptors:

(30) Examination for a First-Class Certificate or Second-Class Certificate of First or Second Division (to include all the required subjects at one time).

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[1] Recommended to be discontinued.

(31) Preliminary Examination for Medical Students (certificate to include all the required subjects at one time).

Scotch Education Department:

(32) Examination for Lower Grade Leaving Certificate (to include all the required subjects at one time).

(33) Examinations for Higher Grade or Honours Leaving Certificate (to include the required subjects).

Educational Institute of Scotland:

(34) Preliminary Medical Examination (certificate to include all the required subjects at one time).

Intermediate Educational Board of Ireland:

(35) Junior or Middle Grade Examination (certificate to include all the required subjects at one time).

(36) Senior Grade Examination (certificates to include the required subjects).

Central Welsh Board:

(37) Senior Certificate Examination.

IV. INDIAN, COLONIAL, AND FOREIGN UNIVERSITIES AND COLLEGES.

Universities of Punjab, Allahabad, and Sydney:

(38) Entrance Examination.

Universities of Malta; Bombay; Madras; M'Gill College and Bishop's College, Montreal; Fredericton, New Brunswick; Toronto; Trinity and Victoria, Toronto; Queen's, Kingston; Western, Ontario; Mount Allison College, New Brunswick; King's College, Nova Scotia; Dalhousie, Halifax; Melbourne; Sydney: and Cape of Good Hope; and the Colleges of Quebec; Trinity, Toronto; Ontario; and New Brunswick:

(39) Matriculation Examination.

Ceylon Medical College; Universities of Manitoba, Otago, and New Zealand; and the Medical Boards of Nova Scotia and Newfoundland;—

(40) Preliminary Examination.

Universities of Madras, Calcutta, Sydney, and Adelaide:

(41) First Examination in Arts.

Universities of Sydney, Adelaide, and Tasmania:

(42) Senior Public Examination.

Codrington College, Barbadoes:

(43) Arts Examinations at Durham University.

Continental Bodies:

(44) The German Abiturienten-Examen of the Gymnasia and Realgymnasia; Examinations entitling to the French Diplomas of Bachelier ès Lettres and Bachelier ès Sciences, and other corresponding Entrance Examinations to the Universities.

Egyptian Government:
(45) Secondary Education Certificate.

(*a*) No certificate from the bodies in the foregoing section (IV.) is accepted unless it shows that the examination has been conducted by or under the authority of the body granting it, includes all the subjects required by the General Medical Council, and states that all the subjects of examination have been passed in at one time; and copies of the form of the required certificate are supplied by the registrar of the Council for the purpose.

(*b*) In the case of natives of India or other Oriental countries whose vernacular is other than English, an examination in a classic Oriental language may be accepted instead of an examination in Latin.

The Subjects in which Courses are required of all Candidates by the General Medical Council.

In every course of professional study and examinations, the following subjects must be contained:—

(1) Physics, including the elementary mechanics of solids and fluids, and the rudiments of heat, light, and electricity.
(2) Chemistry, including the principles of the science, and the details which bear on the study of medicine.
(3) Elementary biology.
(4) Anatomy.
(5) Physiology.
(6) Materia medica and pharmacy.
(7) Pathology.
(8) Therapeutics.
(9) Medicine, including medical anatomy and clinical medicine.
(10) Surgery, including surgical anatomy and clinical surgery.
(11) Midwifery, including diseases peculiar to women and to new-born children.
(12) Theory and practice of vaccination.
(13) Forensic medicine.
(14) Hygiene.
(15) Mental disease.

It is to be understood, as regards the above-mentioned subjects, that the Council offers no opinion as to the manner in which the subjects should be combined or distributed for purposes of teaching or examination.

TABLE III.—*Details of the Curriculum required by the various*

(Minimum Age in all, 21 years;

	SUBJECTS OF COURSES REQUIRED.																
	Length of Compulsory Study at Institution giving Degree.	Chemistry.	Practical Chemistry.	Botany.	Zoology.	Physics.	Practical Physics.	Anatomy.	Practical Anatomy.	Physiology.	Practical Physiology.	Practical Histology.	Materia Medica and Therapeutics.	Practical Pharmacy.	Pathology.	Practical Pathology.	Post mort
SCOTLAND.	Years																
M.B., Ch.B. Universities of Edinburgh, Glasgow, Aberdeen, St. Andrews	2	6	3	3	3	3	..	6	12	6	3	..	6	25 mtgs. or 3 mths.	6	3	3 mths [illegible] Cours
L.R.C.P. and L.R.C.S.Ed.; and L.F.P.S.Glasg.; and the Scotch Colleges	..	6	3	..	3	3	..	6	12	6	..	..	3	3	3	..	3
ENGLAND.																	
London University, M.B. **" " B.S.**	..	C.	C.	..	C.	C.	..	6	12	6	..	..	C.	C.	C.	..	C.
Durham University, M.B. **" " B.S.**	1	6	3	..	3	3	3	12	12	6	3	3	3	3	3	.	[illegible]
Victoria University, M.B. **" " B.S.**	2	6	3	..	4	6	3	6	15	6	C.	..	9	C.	6	C.	12
Birmingham University, M.B. **" " B.Ch.**	4	6	3	..	6	6	3		9	6	3	..	9	3	6	3	12 [illegible]
Universities of Oxford[1] M.B., Cambridge B.C.	(6) (3)	C.	C.	..	C.	Course		C.	6	6	..	..	C.	C.	C.	..	C.
L.R.C.P.Lond.; and M.R.C.S. Eng., London Colleges	..	C.	C.	..	C.	6	..	6	12	C.	6		3	3	3		[illegible]
L.S.A. London, Society of Apothecaries	..	6	3	..	3	..	..	6	12	6	3	..	6	3	3	..	C.
IRELAND.																	
Dublin University, B.A. M.B., B.Ch., B.A.O.	4	6	3	3	3	C.	..	6	12	12	..	3	3	..	6	3	3
Royal University, Dublin, M.B., B.Ch., B.A.O.	..	6	3	3	3	3		12	12	12	3	..	3	3	3	3	[illegible]
L.R.C.P.I. and L.R.C.S.I., Irish Colleges	..	6	3	..	3	3	..	6	12	6	..	3	3	3 or 3 yrs. apprentice.	..	..	3 mt

Figures represent months unless

[1] The Oxford degrees are only conferred on those holding the B.A. degree of the University; the details of the

Universities and Licensing Bodies for Degrees or Diplomas.

length of Course, 5 years.)

WITH LENGTH OF ATTENDANCE.

Medical Jurisprudence and Public Health.		Medicine.	Clinical Medicine.	Surgery.	Clinical Surgery.	Operative Surgery.	Regional Anatomy.	Midwifery and Diseases of Women.	Diseases of Women.	Labour Cases, or Practical Midwifery.	Hospital Practice.	Dispensary.	Mental Diseases.	Infectious Diseases.	Ophthalmology.	Diseases of Children, or Laryngology.	Clerk and Dresser in Hospital.		Vaccination.
											Years.		Meetings.				Med.	Surg	
3		6	9	6	9	C.	..	6	..	12 cases or 3 mths. and 6 cases	3	6	16 16 C. C.	12 10 3 mths. C.	24 20 3 mths. C.	18 (optional) 3 mths.	6	6	Certificate.
3		6	0	6	9	..	..	3	..	20 cases or 3 mths. and 6 cases	2	6	13	13	13	..	Certificate.		
													Mths.	Months.	Months.				
Course.		6	24	6	24	.. C.	.. ..	C.	..	20 cases	4	6	2	2	..	..	..	..	
3	C.	12	18	12	18	.. C.	.. C.	3	..	20 "	4	..	3	20 cases	..	..	6	6	
3	3	12	24	6	24	.. 6	.. ..	6	3	20 "	2	..	C.	C.	..	..	6	6	
3	6	12	18	12	18	3	3	6	3	20 "	3	..	3	3	3	..	6	6	
C.	C.	6	C.	6	C.	C.	..	C.	..	20 "	3	..	C.	3	..	..	6	6	
3	3	6	9	6	9	C.	..	3	12 mtgs.	20 "	2	6	C.	C.	3	..	6	6	
3	3	6	9	6	9	3	..	6	..	20 "	3	..	3	3	3		6	6	
											Mths.								
3	..	6	27	6	27	3	6	6	..	6 mths. 30 cases	27	..	3	C.	3	..	..	..	1
3	3	6	33	6	33	24 mtgs.	..	6	..	6 mths. 20 cases	33	..	3	10 cases and 3 mths.	3	..	3	3	10 mtgs.
3	..	6	27	6	27	30 mtgs.	..	6	..	6 mths. 30 cases	27	..	3	C.	3		..	..	Certificate.

otherwise stated. C. = Course.

curriculum required differ in many respects from the others, and may be obtained from the University Authorities.

TABLE IV.—*Table of Universities, Medical Schools and Institutions, with the Dates for Preliminary Examinations and Sessions,* 1904–1905.

		PRELIMINARY OR MATRICULATION EXAMINATION.	SESSIONS.		
			Winter.	Spring.	Summer.
ENGLAND AND WALES.					
London University		Jan. June. Sept.	..	..	..
The Royal College of Physicians, London; and Surgeons, England		Oct. April. (Coll. of Jan. July. Preceptors.)	..	..	..
London Hospitals	Guy's	As in last two	Oct. 3.	..	Beginning of May.
	St. Bartholomew's		" 3.	..	"
	St. Mary's		" 3.	..	"
	Westminster		" 3.	..	"
	London		" 1.	..	"
	Middlesex		" 3.	..	"
	St. George's		" 1.	..	..
	Charing Cross		" 3.	..	"
	St. Thomas's		" 3.	..	"
	King's		" 3.	..	..
	University		" 3.	..	..
PROVINCIAL.					
Durham University		Sept., Jan., March.	" 3.	..	"
University of Liverpool		June and September.	" 1.	..	"
Victoria University, Manchester			" 3.	..	"
University of Birmingham		June and September.	" 3.	..	"
University College, Bristol			" 3.	..	"
University College, Sheffield			" 3.	..	"
University of Leeds		...	..	..	..
Universities of Wales	University College, Bangor	Local Examinations by College of Preceptors, etc.	" 4.	..	..
	" " Cardiff		..	..	..
	" " Aberystwyth	..	..	..	..
SCOTLAND.					
Universities of	Edinburgh	Sept. 25. March.	Oct. 18.	..	May.
	Glasgow		" 13.	..	April.
	Aberdeen		" 11.	..	..
	St. Andrews		" 10.	..	..
Edinburgh School of Medicine		Sept. 11. March.	" 18.	..	May.
University College, Dundee		Sept. 25. March.	" 14.	..	April.
St. Mungo's College, Glasgow		Sept., April, July.	" 13.	..	"
Anderson's College, Glasgow			" 13.	..	"
IRELAND.					
Dublin University		(B.A. Degree.)	" 1.	..	May.
Royal University of Ireland		Sept. 21. June.	..	..	..
Conjoint Colleges		" March.	" 1.	..	April 1.
Catholic University		" "	Nov. 2.	..	..
Queen's Colleges	Galway	Oct., Nov. ..	Oct. 21.	..	May.
	Cork	" ..	" 24.	..	"
	Belfast	" ..	" 18.	..	"

C. SINGLE QUALIFICATIONS NOT CONFERRING IN THEMSELVES THE RIGHT TO REGISTER.

Many of the colleges confer degrees or diplomas on members of the profession who already possess a registrable qualification. The M.B. of London and Durham Universities allows the holder to practise, while the examination for M.B. at Oxford and Cambridge is the same as that for B.C.

Owing to the limited space at our disposal, it is impossible to enter into any details as to the conditions under which these degrees and diplomas are given, especially as they appertain to graduates who hardly require information about them. All the universities confer degrees of Doctor of Medicine and Master in Surgery on their graduates, only imposing as a condition that a longer or shorter interval shall elapse between graduation and the grant of the higher degree. Generally, the candidate has to present an original essay or thesis, and in some instances to pass a clinical examination.

At Cambridge University the M.D. degree may be taken three years after M.B., B.C. two years after M.C. The London and Durham M.D. and M.S. are conferred on M.B. and B.S. graduates respectively, after two years have elapsed; the equivalent degrees of the Victoria University, after one year. At the Scotch Universities the degrees of M.D. or Ch.M. are granted after two years' practice or one year's hospital or research work, if the candidate be 24 years old. Both the Irish Universities require three years to elapse.

Royal Colleges.

The Royal College of Physicians of London grants the membership to university graduates or to its licentiates after an examination, fee £42. Recipients must have attained the age of 25 years. The Royal College of Surgeons of England grants its fellowships to persons of or above 25 years of age, who have been five years in practice, and who must pass the membership examination before the second examination for the higher degree. Fee, if a member, £15, 15s.; if not, £31, 10s. Similarly, the Scottish corporations grant single licences to persons of either sex who already hold a recognised qualification—the Royal College of Physicians, Edinburgh, to those with a surgical; the Royal College of Surgeons, Edinburgh, and the Faculty in Glasgow, to those with a medical qualification. The fee in each case is £15, 15s.

The Royal College of Physicians, Edinburgh, confers its membership on licentiates of the college, and graduates of universities of the United Kingdom, after attaining 24 years, on examination. Fee for licentiate, £15, 15s.; for others, £31, 10s. The fellowship is conferred by election on members, aged 25, of two years' standing. Fee, £56, 10s.

An examination is required of candidates for the Fellowship of the Royal College of Surgeons, who must be 25 years of age, and registered practitioners of two years' standing. Fee for licentiates, £30; for others, £45. Similar regulations apply to the Fellowship of the Faculty of Physicians and Surgeons of Glasgow, but 24 is the minimum age. The fees are different, if the candidate desires to qualify for holding office or not; £50 or £30 for non-licentiates, £15 or £25 for licentiates.

The Royal College of Physicians of Ireland grants licences in medicine and in midwifery to registered practitioners, a membership diploma to licentiates 25 years of age, of three years' standing, and to practitioners of seven years' standing or University B.A.s., after one year's possession of the licence. Fee, £21 (£15, 15s. to graduates in Arts).

The Royal College of Surgeons in Ireland retains the right of deciding whether candidates for the Fellowship shall be admitted to examination or not. Licentiates or graduates in surgery of less than ten years' standing have to pass two examinations; fees, £26, 5s. for licentiates of the college, £42 for others. When of more than two years' standing they have only one examination; fees, £26, 5s. and £42, as before.

Further information with regard to these qualifications can be obtained from the secretaries of the different colleges. A list containing their names and addresses will be found below (p. xxii.).

POST-GRADUATE COURSES.

In London, Edinburgh, Dublin, Cambridge, regular post-graduate classes are now held, although, when compared with the classes for graduates carried on in connection with many of the continental medical schools, they still leave much to be desired, both in arrangement and in the zeal shown by those who might be expected to support them more warmly. At most of the infirmaries and hospitals throughout the kingdom, in which clinical teaching is recognised, graduates can attend either on the same terms as undergraduates or at special rates.

Nine of the London Schools of Medicine have lately combined in a scheme for the better provision of post-graduate clinical teaching; a fee of £7, 7s. or of £10, 10s., enabling practitioners to attend the clinical instruction, the operations and autopsies, for three or six months respectively, at any one of these nine hospitals.

In May 1899, a London Medical Graduates College and Polyclinic was opened at 22 Chenies Street, Gower Street, W.C., at which consultations in various branches of medicine and surgery are held daily, except on Saturdays; clinical lectures are given, and practical classes conducted. An annual subscription of £1, 1s. admits the subscriber to the consultations and lectures. The fees for special courses vary from £1, 1s. to £5, 5s. The ordinary work of the College began on 3rd September; the practical classes will commence on the 17th.

Both in London and Liverpool Schools of Tropical Medicine have been established, at which graduates can study at first hand the diseases special to tropical countries. The London School commences the first of these annual courses on 1st October.

At Charing Cross Hospital special series of clinical lectures and practical demonstrations, exclusively arranged for the convenience of practitioners and post-graduate students, are given by members of the staff throughout the year. The lectures for the year are arranged in three courses, each consisting of ten meetings, and lasting ten weeks.

In Cambridge, graduates of other universities are admitted as advanced students. They may for one or more terms pursue courses of advanced study or research, literary or scientific, under the direction of the University teachers, and may become members of certain colleges without fulfilling the same conditions as are imposed on junior students, their collegiate status being assimilated to that of students who have taken their first degree in the university.

In Edinburgh a number of classes open to post-graduates are carried on throughout the whole year:—Ophthalmology and Ophthalmoscopy; Laryngology and Diseases of the Throat, Nose, and Ear; Dermatology; Diseases of Children; Chest Diseases; and Gynæcology. A series of demonstrations of Modern Gastric Methods of Analysis and Treatment is available at any time on the request of a sufficient number of post-graduates desiring the course; while arrangements are from time to time made whereby these various classes may be attended as far as is possible, and according to demand concurrently. On such occasions special courses in advanced surgical anatomy, medical anatomy, electrical methods, sanitary practice, and other specialities are included.

Any graduate desirous of ascertaining the details of the various classes should apply to the Honorary Secretary, Post-Graduate Courses, Surgeons' Hall, Edinburgh, when a full syllabus will be forwarded, or information supplied.

THE MEDICAL EDUCATION OF WOMEN.

A number of qualifications are now open to men and women alike. The degrees of the London and Durham Universities in England, of the Royal University of Ireland, and of the four Scotch Universities, may be conferred on women; who also may be granted the conjoint diplomas of the Scotch and Irish Boards, and the licence of the Society of Apothecaries, London.

The conditions for the qualification of women are practically the same as those for men. The University of Edinburgh, however, does not recognise attendance on mixed classes without sufficient reason shown.

The secretaries of the different schools, from whom prospectuses and any information required may be obtained, are as follows:—

London School of Medicine for Women—Miss Douie, 8 Hunter Street, Brunswick Square, W.C.
Newcastle School of Medicine (Durham University)—Secretary, Durham University.
Medical College for Women, Minto House, Edinburgh—Miss H. F. Mackay.
Queen Margaret's College, Glasgow—Miss Galloway.

Royal College of Surgeons, Ireland (rooms in connection with the college are set apart for the use of female students)—I. F. Blake, Registrar.

The tables given below show the different degrees and diplomas open to women, the recognised schools, and the approximate cost of the class and college fees.

TABLE V.—*Degrees and Diplomas open to Women.*

University Degrees.	Diplomas.
London. Durham. The Royal, Ireland. The Four Scotch Universities.	1. *Conferring Qualification to Practise.* The Triple Qualification of the Royal Colleges, Scotland. The Conjoint Qualification of the Royal Colleges, Ireland. The Society of Apothecaries, London. 2. *Not conferring Qualification.* Licence of the Royal College of Surgeons, Edinburgh.

With the exception of two of the Scottish Universities, all these qualifications are given on the same conditions as to men. At Edinburgh and Glasgow Universities the compulsory two years' residence is allowed to be represented by residence at a recognised School for the Medical Teaching of Women.

TABLE VI.—*Medical Schools for Women.*

Name.	Cost of Curriculum and Fees.
London School of Medicine for Women, Brunswick Square	£125
College of Medicine, Newcastle-on-Tyne .	£146
Scottish Association, Edinburgh (qualifies for Edinburgh University)	(University), £128, 7s. (Colleges), £130
Queen Margaret College, Glasgow (qualifies for Glasgow University)	£129
Schools of Surgery of the Royal College of Surgeons, Ireland	(For College Degree), £165–£172.
Aberdeen and St. Andrews Universities (only first two years at St. Andrews).	
Dundee University College.	

PUBLIC HEALTH.

The Local Government Act, passed in 1888, provides that all medical officers of health of counties or districts with a population of 50,000 or more, must possess a diploma in public health, or must have been a medical officer of a district with 20,000 inhabitants for three consecutive years before 1892; or, before the passing of the aforesaid Act, have been for not less than three years a medical officer or inspector under the Local Government Board.

Qualifications in public health (sanitary science, sanitary medicine, State medicine) are therefore much more sought after than formerly. They do not carry a right to register, and are only conferred on candidates already possessed of a registrable qualification.

Certain regulations for candidates for diplomas in public health, designed to ensure "the possession of a distinctly high proficiency, scientific and practical, in all the branches of study which concern the public health," have been laid down by the General Medical Council. The Council now recommends the following rules to be observed:—

Every candidate shall produce evidence of having, after obtaining a registrable qualification, attended, during six months, practical instruction in a laboratory.

1. A period of not less than twelve months shall elapse between the attainment of a registrable qualification in medicine, surgery, and midwifery, and the admission of the candidate to any examination or any part thereof for a diploma in sanitary science, public health, or State medicine.

2. Every candidate shall produce evidence of having, after obtaining a registrable qualification, attended during six months, practical instruction in a laboratory or laboratories, British or foreign, approved of by the body granting the diploma, in which chemistry, bacteriology, and the pathology of the diseases of animals transmissible to man are taught.

3. Every candidate shall produce evidence that, during a period of six months after obtaining a registrable qualification, he has practically studied the duties of outdoor sanitary work—(*a*) In England and Wales, either under the medical officer of health of a county, or of a single sanitary district having, at the date of the last census, a population of not less than 50,000, or a medical officer of health, devoting his whole time to public health work; or (*b*) in Scotland or Ireland, under the medical officer of health of a county, or of one or more sanitary districts having at the date of the last census a population of not less than 30,000; or (*c*) under a medical officer of health who is also a teacher in the department of public health of a recognised medical school. The six months may be reduced to three, if a three months recognised course of Sanitary Law and Engineering Vital Statistics, etc., has been attended.

⁂ Any candidate who shall produce evidence that he has himself held an appointment of medical officer of health, under conditions not requiring the possession of a special sanitary diploma, shall be exempt from this regulation.

4. Every candidate shall produce evidence that he has attended the clinical practice for three months of a hospital for infectious

diseases, at which opportunities are afforded for the study of methods of administration.

5. The examination shall be conducted by Examiners specially qualified, and shall include laboratory work.

⁂ The rules as to study shall not apply to medical practitioners registered, or entitled to be registered, on or before 1st January 1890.

Degrees and Diplomas.

DEGREES (FOR UNIVERSITY GRADUATES IN MEDICINE).

M.D. (State Medicine), London. (Two years' study required.)

B.Hy., Durham. (Three months' course in comparative pathology (lectures), etc.; must study at Newcastle School of Medicine.)

B.Sc., Birmingham. (Six months' laboratory course of hygienic chemistry; a course of bacteriology; six months' practical outdoor experience; attendance upon a fever hospital.)

B.Sc., Edinburgh. (Eight months' laboratory (five at Edinburgh University) courses in physics, geology, public health, sanitary engineering, and in mensuration and drawing required, as well as official regulations.)

D.Hy., Durham. (Earliest date, two years after B.Hy., spent as M.O.H. Essay sent in.)

D.Sc., Edinburgh. (Five years after B.Sc., Thesis and Examination.)

DIPLOMAS.

D.P.H.
- Durham University. (Regulations as for B.Hy., but need not be a University graduate, nor have studied at Newcastle.)
- Oxford University. (Must fulfil General Medical Council's conditions.)
- Cambridge University. (Do.)
- Victoria University. (As at Oxford.)
- Aberdeen University. (Fever hospital course, six months; if not M.B.Aberd., must attend some of the necessary classes.)
- Royal Colleges, London. (As at Cambridge.)
- Royal Colleges, Edinburgh and Glasgow. (As at Oxford.)

D.S.M., Dublin University. (Must be a graduate of the Universities of Dublin, Oxford, or Cambridge, or M.D.)

,, Royal Colleges, Ireland. (As at Oxford.)

D.S.Sc., Royal University, Ireland. (Only conferred on graduates of the University. Cf. Calendar.)

Medical practitioners who registered or were entitled to register before 1st January 1890 are admitted to the examination for the Durham D.P.H., under the same conditions as are noted above. Twenty-eight days' notice is required. Fee, £10, 10s. At Oxford and Cambridge Universities the diplomas in public health are granted to any registered person who, if he qualified before 1st January 1890, is not required to pursue a prescribed course of study. Similar regulations govern the examinations of the different colleges in the case of those who qualified prior to 1890.

The actual scope of the examinations as held at the different centres can be easily ascertained from the syllabuses and calendars to be obtained from the secretaries. The titles of the books best adapted for perusal in view of the examinations may be seen in the *British Medical Journal* for September 3, 1904.

Fees for examinations.—D.P.H.—£10, 10s., English, Scottish, and Irish Colleges; Durham, St. Andrews, and Victoria Universities: £5, London and Royal Irish Universities: £5, 5s., Aberdeen: £10, Oxford: £12, 12s., Cambridge.

B.Sc.—£6, 6s., Edinburgh; £10, Birmingham.

B.Hy.—£16, 16s., Durham.

Usual fee for six months' laboratory work, £10, 10s. to £21.

Institutions at which Laboratory Work and Classes for Public Health Curriculum can be taken.

LONDON.

St. Bartholomew's Hospital.—Inclusive fee, 20 guineas.

Charing Cross Hospital.—Inclusive fee, 20 guineas.

St. George's Hospital.—Inclusive fee, 20 guineas; for candidates registered before 1st January 1890, 12 guineas.

Guy's Hospital.—Inclusive fee for six months' course of laboratory instruction and lectures, 20 guineas.

King's College.—Fee includes all course necessary.

London Hospital.—Inclusive fee, 20 guineas; three months' course, 12 guineas.

St. Mary's Hospital.—Six months' course, inclusive fee, 12 guineas.

St. Thomas's Hospital.—Inclusive fee, 20 guineas; short course, 6 guineas.

University College.

PROVINCIAL.

Cambridge University.

Birmingham University.—Inclusive fee, 13 guineas.

University College, Liverpool.

Yorkshire College, Leeds.

University of Durham, College of Medicine, Newcastle-on-Tyne.

University College, Bristol.

IRELAND.

School of Physic, Dublin.

The Catholic University School of Medicine.

Royal College of Surgeons, Schools of Surgery, Dublin.

SCOTLAND.

University of Edinburgh.—Fees, winter session, 10 guineas; summer session, 6 guineas.

University of Glasgow.—Fee for course of instruction, 10 guineas.

University of Aberdeen.—Fee for course of instruction, 9 guineas.

St. Mungo's College, Glasgow.—Fees: winter session of lectures and six months' laboratory instruction, 12 guineas; summer session of lectures and three months' laboratory instruction, 6 guineas.

The Conjoint Board in Scotland.—Fee for six months' laboratory course, 18 guineas.

CLINICAL HOSPITALS.

There are a number of hospitals throughout the kingdom which may be attended for the purpose of clinical study, especially during the fifth year of the curriculum, and attendance at which is accepted by many of the licensing boards as part of the compulsory period for hospital work.

In *London*, in addition to the clinical hospitals attached to the medical schools, the conjoint board of the Royal Colleges of Physicians and Surgeons accept certificates of attendance during the fifth year of study, from the—Great Northern Central Hospital, 155 beds; West London Hospital, 175 beds, Fee, 5 guineas; The Hospital for Sick Children, Great Ormond Street, 186 beds, Fee, 3 guineas; East London Hospital for Children, 100 beds, Fee, 4 guineas; Royal London Ophthalmic Hospital, 100 beds, Fee, 5 guineas; Hospital for Consumption, Brompton, 321 beds, Fee, 8 guineas; City of London Hospital for Diseases of the Chest, 164 beds; National Hospital for the Paralysed, etc., Queen Square, 200 beds; Queen Charlotte's Lying-in Hospital, 1100 patients annually, Fee, 8 guineas for four weeks.

Fever hospitals and asylums.—The Metropolitan Fever Hospitals, Fee, £3, 3s., two months, £1, 1s. each additional month; Bethlem Royal Hospital, Lower Hall Asylum, Bow; Camberwell House Asylum. Bethnal.

THE PROVINCES.

Liverpool—Royal Southern, 200 beds, Fee, £26, 5s.[1]; Northern, 155 beds, Fee, £26, 5s.[1]; Eye and Ear Infirmary, Myrtle Street, 46 beds; Infirmary for Children, 88 beds, free.

Manchester—St. Mary's Hospital for Diseases of Women and Children, 55 beds, 3400 labours, Fee for necessary course, £2, 2s.

Newcastle-on-Tyne—Hospital for Sick Children, 60 beds, free.

Bath—Royal United Hospital, 130 beds.

Birmingham—Midland Hospital for Skin and Urinary Diseases, £5, 5s. for three months.

Bradford—Royal Infirmary, 230 beds, £10, 10s.[1]

Brighton—Sussex County Hospital, 190 beds, £21 for two years.

Derby—Derbyshire Royal Infirmary, 198 beds, £10, 10s. annually.

Devonport—Royal Albert Hospital, 88 beds, £2, 2s.

Hospitals in *Exeter*, *Gloucester*, £20 a year; *Lincoln*, £10, 10s.; *Norwich*, £15, 15s.; *Nottingham*, £10, 10s.; *Staffordshire*, £10, 10s.; *Winchester*, £21;[1] *Wolverhampton*, £21.[1]

SCOTLAND.

Edinburgh—Royal Infirmary, 790 beds, £12[1]; Victoria Hospital for Consumption, 15 beds, £2, 2s. for course; Royal Hospital for Sick Children, 119 beds, £2, 2s. for course; Eye, Ear, and Throat Infirmary, 6 beds, £1, 1s.; Royal Maternity, 40 beds, £2, 2s.; City Hospital for Infectious Diseases, 400 beds, £2, 2s.; Royal Asylum, Morningside, 700 beds, £2, 2s.

Glasgow—Royal Hospital for Sick Children, 80 beds, £1, 1s.; Western Infirmary; 400 beds, £21[1]; Eye Infirmary, £1, 1s.; Royal Infirmary, £21[1]; Maternity; Belvedere Fever Hospital; Lock Hospital.

Dundee—Royal Infirmary, 286 beds; Royal Asylum.

Aberdeen—Royal Infirmary, Fee, £6; Sick Children's Hospital.

IRELAND.

Dublin—Sir Patrick Dun's Hospital, £12, 12s;[1] Richmond, Whitworth, and Hardwicke Hospitals,[2] 312 beds; Richmond Asylum, 1200 beds; Adelaide Hospitals, 140 beds; City of Dublin Hospital; Jervis Street Hospital, £12, 12s. a year; Mater Misericordiæ Hospital,[2] 323 beds; Dr. Steeven's Hospital,[2] 200 beds, £10, 10s., three months; St. Vincent's Hospital, 160 beds; Meath Hospital,[2] 160 beds; Rotunda Hospital, 1700 labours intern, 1800 extern annually—Fee, for term, six months, £21, three months, £12, 12s., Extras, £10, 10s. and £6, 6s., Cork Street Fever Hospital; Coombe Lying-in Hospital.

Belfast—The Royal, £20;[1] Maternity; Ophthalmic; Eye, Ear, and Throat Hospitals; and those for Diseases of Women, for Sick Children, and the District Asylum.

Cork—North (100 beds) and South (100 beds) Infirmaries; the Mercy, Cork Union, Lying-in, Maternity, Fever, Gynecological, and Ophthalmic and Aural Hospitals; and the Eglinton Asylum.

Galway—County Infirmary and Lower Hospital.

DENTAL SURGERY.

Licences to practise dentistry and to be registered are obtainable from the Royal College of Surgeons of England, of Edinburgh, and of Ireland, and from the Faculty of Physicians and Surgeons of Glasgow.

A large number of the medical teaching institutions provide special arrangements for dental students. A list of the majority of these is given on page xxii.

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[1] Perpetual.

[2] Contain beds for Fever patients.

REGULATIONS OF THE GENERAL MEDICAL COUNCIL.

Candidates for a diploma in dental surgery shall produce certificates of having been engaged during four years in professional studies, and of having received three years' instruction in mechanical dentistry from a registered practitioner. One year's *bonâ fide* apprenticeship with a registered dental practitioner, after being registered as a dental student, may be counted one of the four years of professional study. The three years of instruction in mechanical dentistry, or any part of them, may be taken by the dental student, either before or after his registration as a student; but no year of such mechanical instruction shall be counted as one of the four years of professional study unless taken after registration.

A register of dental students is kept by the Registrar of the General Medical Council, 299 Oxford Street, London.

Preliminary education.—Dental students are subject to the same regulations as regards preliminary education as medical students, but professional study may commence by pupilage with a registered dental practitioner.

THE ROYAL COLLEGE OF SURGEONS OF ENGLAND.

Licence in Dental Surgery.

The following are the regulations:—

I. There is a Preliminary Science Examination and two Professional Examinations for the licence. The Preliminary Science Examination consists of chemistry, physics, and practical chemistry, and is identical with Part I. of the First Examination of the Examining Board in England for medicine. The First Professional Examination for the licence consists of mechanical dentistry and dental metallurgy; and the Second, general anatomy and physiology, general surgery and pathology, dental anatomy and physiology, dental pathology and surgery, and practical dental surgery.

Candidates will be required to show a general knowledge of the anatomy of the whole human body.

II. Candidates will be required to produce certificates of having received instruction, at an institution recognised for the purpose, in chemistry, physics, and practical chemistry, before entering for the Preliminary Science Examination.

⁂ This instruction may be taken prior to the date of registration as a dental student.

III. Candidates will be required to produce the following certificates before entering for the First Professional Examination, namely:—

1. Of having been engaged, during a period of not less than three years, in acquiring a practical familiarity with the details of mechanical dentistry, under the instruction of a competent practitioner, or under the direction of the superintendent of the mechanical department of a recognised dental hospital, where the arrangements for teaching mechanical dentistry are satisfactory to the Board of Examiners in Dental Surgery. In the case of qualified surgeons, evidence of a period of not less than two instead of three years of such instruction will be sufficient.

⁂ This instruction may be taken prior to the date of registration as a dental student.

2. Of registration as a dental student by the General Medical Council.

3. Of having attended at a recognised dental hospital and school:

(*a*) A course of lectures on dental metallurgy.

(*b*) A course of practical dental metallurgy.

(*c*) A course of lectures on dental mechanics.

(*d*) A course of practical dental mechanics, including the manufacture and adjustment of six dentures and six crowns.

IV. Candidates will be required to produce the following certificates before entering for the Second Professional Examination, namely:—

1. Of having been engaged during four years in the acquirement of professional knowledge, subsequently to the date of registration as a dental student.

2. Of having attended at a recognised dental hospital and school:

(*a*) A course of dental anatomy and physiology.

(*b*) A separate course of dental histology, including the preparation of microscopical sections.

(*c*) A course of dental surgery.

(*d*) A separate course of practical dental surgery.

(*e*) A course of not less than five lectures on the surgery of the mouth.*

* These lectures may be given either at a recognised dental hospital and school, in which case the lecturer must be a qualified surgeon practising surgery, or they may be given at a recognised medical school, and may form part of the course required by Clause 8 (*d*).

3. Of having attended at a recognised dental hospital or in the dental department of a recognised general hospital, the practice of dental surgery during two years.

4. Of having attended at a recognised medical school:

(*a*) A course of lectures on anatomy.

(*b*) A course of lectures on physiology.

(*c*) A separate practical course of physiology.

(*d*) A course of lectures on surgery.

(*e*) A course of lectures on medicine.

5. Of having performed dissections at a recognised medical school during not less than twelve months.

6. Of having attended at a recognised hospital or hospitals, the practice of surgery and clinical lectures on surgery during two winter sessions.

7. Of being 21 years of age.

⁂ The certificates of professional study will be required to show that students have attended the courses of professional study to the satisfaction of their teachers.

V. Candidates may present themselves for the Preliminary Science Examination before entering at a dental school, on production of the certificates required under Section II. This examination will be identical with Part I. of the First Examination of the Examining Board in England.

VI. Candidates may present themselves for the First Professional Examination for the licence after the completion of six months' attendance at a recognised dental hospital and school, on production of the certificates required under Section III.

VII. Candidates may present themselves for the Second Professional Examination, on production of the certificates required under Section IV., after the completion of four years' professional study from the date of registration as a dental student, and after the lapse of not less than six months from the date of passing the First Professional Examination.

VIII. Synopses of the examination in chemistry, physics, and practical chemistry, and dental metallurgy, are issued with the regulations.

IX. The Preliminary Science Examination will be held in January, March or April, July and October in each year.

The First and Second Professional Examinations will be held in May and November in each year. Candidates are required to give twenty-one clear days' notice of their intention to present themselves for examination.

Special Exemptions.

A candidate who shall produce satisfactory evidence of having passed an examination for a degree in medicine, conducted at a university in the United Kingdom, in India, or in a British colony, on the subjects of the Preliminary Science Examination, will be exempt from that examination.

Candidates who have passed the Second Examination of the Examining Board in England, or who shall produce evidence of having passed the examination in anatomy and physiology required for the licence in surgery of the Royal College of Surgeons of Edinburgh, the Royal College of Surgeons in Ireland, or the Faculty of Physicians and Surgeons of Glasgow, or an examination in anatomy and physiology required for a degree in medicine or surgery at a university in the United Kingdom, will be exempt from re-examination in those subjects.

Candidates who are members of the college, or who have passed the examination in surgery of the Examining Board in England, or who shall produce evidence of having passed the examination in surgery for the licence in surgery of the Royal College of Surgeons of Edinburgh, the Royal College of Surgeons in Ireland, or the Faculty of Physicians and Surgeons of Glasgow, or an examination in surgery for a degree in medicine or surgery at a university in the United Kingdom, will be exempt from re-examination in general surgery and pathology.

Fees to be paid by candidates, £21.

THE ROYAL COLLEGE OF SURGEONS OF EDINBURGH.

Licence in Dental Surgery.

The candidate must fulfil the conditions of the regulations of the General Medical Council (see above); and the regulations as to curriculum are generally the same as those of the Royal College of Surgeons of England.

Special Exceptions.

Candidates who have passed the corresponding examinations for the Triple Qualification will be exempt from the First Dental Examination, and will have the advantage of being admissible either to the Final Dental Examination or to the Final Examination for the Triple

Qualification, or to both. But the First Dental Examination will not be held as equivalent to the Triple Examinations, and will admit to the Final Dental Examination only. Candidates who are licentiates of this college, or who may be registered medical practitioners, will require to produce certificates of attendance on the special subjects only, and will be examined in these only for the dental diploma. Any candidates who shall produce satisfactory evidence of having passed in any of the subjects of the First Dental Examination, before any dental or surgical licensing board recognised by the Royal College of Surgeons of Edinburgh, will be exempt from examination in such subject or subjects; but no examination will be recognised as giving exemption, unless it is coextensive in its scope with the examinations of this college, and is the only final examination on the subject or subjects required by the board at which it was passed.

Fees.—The fee for the diploma is £10, 10s. to those who began their studies before 1st October 1896; £15, 15s. to those who began after that date.

Faculty of Physicians and Surgeons of Glasgow.

The regulations as to certificates, curriculum, number of examinations, fees, and examinations are in effect similar to those of the Royal College of Surgeons of Edinburgh. There is special provision for candidates who intend to qualify both under the Medical and Dentists Act, and there is an examination in practical dentistry conducted in a dental hospital, and also a practical examination in mechanical dentistry.

The Royal College of Surgeons in Ireland.

Licence in Dentistry.

Candidates are required to pass three examinations, namely, Preliminary (in general education), Primary Dental, and Final Dental.

DENTAL TEACHING INSTITUTIONS.

London.

Dental Hospital of London and School of Dental Surgery, Leicester Square. Fee for dental course of two years, £50. Fee for general and hospital practice for two years, £55.

National Dental Hospital or College, Great Portland Street, W. Fee for necessary course, £42.

Guy's Hospital and London Hospital.

Provinces.

University of Birmingham. Composition fee, £73, 2s.

Liverpool Dental Hospital (University College). Composition fee, £73, 2s.

Bristol General Hospital.

Durham University and Newcastle School of Medicine.

University College, Bristol.

Owens College, Manchester. [illegible]

Devon and Exeter Dental Hospital, Exeter.

Scotland.

Incorporated Edinburgh Dental Hospital and School. Minimum fee, £78, 13s.

Dental Hospital and School, Glasgow.

Dental Department, Royal Glasgow Infirmary.

Anderson's College, Glasgow.

Ireland.

School of the Royal College of Surgeons, Ireland.

Special composition fees are charged at several of the London hospitals for the classes required by dental students apart from those taken at a dental hospital. Thus, Charing Cross and Middlesex Hospitals, £56, 14s.; Westminster Hospital, £50; St. Thomas's, £65; St. George's, £50; King's College, hospital fee, two years, £25, 4s.; lectures, £15, 15s.

NAMES AND ADDRESSES OF THE SECRETARIES AND REGISTRARS OF CERTAIN OF THE MEDICAL SCHOOLS.

I. *Branch Registrars of the General Medical Council.*

England—Mr. H. E. Allen, B.A., LL.B., 299 Oxford Street, London, W.

Scotland—Mr. James Robertson, 54 George Square, Edinburgh.

Ireland—Mr. Richard J. E. Roe, 35 Dawson Street, Dublin.

II. *Secretaries and Registrars, etc., of Medical Bodies.*

The Secretary—English Conjoint Board, Victoria Embankment, London, W.C.

The Secretary—Royal College of Surgeons, Lincoln's Inn Fields, London, W.C.

The Secretary—Apothecaries' Hall, Blackfriars, London, E.C.

The Secretary—University of Durham, College of Medicine, Newcastle-on-Tyne.

The Secretary—Royal College of Physicians, Edinburgh.

The Secretary—School of Medicine of the Royal Colleges, Edinburgh, 24 Forrest Road, Edinburgh.

The Secretary—Royal College of Surgeons, Edinburgh.

The Secretary—Anderson's College Medical School, Glasgow.

The Secretary—Educational Institute of Scotland, 40 Princes Street, Edinburgh.

The Secretary—Royal University of Ireland, Dublin.

The Registrar—Royal College of Physicians, Pall Mall East, London, S.W.

The Registrar—University of London, Burlington Gardens, London, W.

The Secretary—University of Birmingham.

The Dean of the Faculty of Medicine—In each of the Scotch Universities.

The Dean of the Faculty of Medicine—Victoria University, Owens College, Manchester.

The Secretary—Irish Conjoint Board, 6 Kildare Street, Dublin.

III. *Inspectors of Conjoint Examination in Scotland.*

Mr. James Robertson, 54 George Square, Edinburgh.
Mr. Alexander Duncan, B.A., 242 St. Vincent Street, Glasgow.

ARMY MEDICAL DEPARTMENT.

WAR OFFICE, LONDON.

Schedule of Qualifications necessary for Candidates desirous of obtaining Commissions in the Army Medical Staff, with the Conditions of Service.

QUALIFICATIONS.

1. A candidate for a commission in the Army Medical Staff must be 21 years and not over 28 years of age at the date of commencement of the entrance examination. He will be required to complete the following forms:—

1. Name in full.
2. Address.
3. Date of birth.
4. Registrable qualifications.
5. Academic or other distinction.
6. Name of Dean or other responsible authority of the school in which the candidate completed his course as a medical student.
7. Particulars of any commission or appointment held in the public services.
8. Date of examination at which the candidate proposes to present himself.

[*N.B.*—Misstatements invalidate subsequent appointments, etc.]

The Dean of the candidate's medical school will be requested to furnish a confidential report anent the candidate—his character, conduct, ability, and fitness. If approved by the Director-General, he will then be allowed to compete; first being examined by a board of medical officers.

The medical examination includes height, weight, chest measurement, eyesight, hearing, speech, condition of teeth, of heart and lungs, rupture, varicocele, varicose veins, development of limbs, of feet and toes, of skin, congenital malformations, and constitution. If there is any doubt, the Board have to state whether candidate, in their opinion, is of pure European descent.

The Secretary of State reserves the right of rejecting any candidate who may show a deficiency in his general education, as evinced by bad spelling or composition.

An entrance fee of £1 is required from each candidate admitted to the competition, and is payable at the conclusion of his physical examination, if pronounced fit.

A candidate successful at the entrance examination will be appointed a lieutenant on probation, and will be required to pass through such courses of instruction as the Secretary of State shall decide, and, after passing the examinations in the subjects taught, and satisfying the Director-General that he possesses the necessary skill, knowledge, and character for permanent appointment to the Royal Army Medical Corps, his commission as lieutenant will be confirmed. The commission shall bear the date of the officer's appointment as lieutenant on probation.

Before the commission as a lieutenant on probation is confirmed, he must be registered under the Medical Acts in force in the United Kingdom at the time of his appointment.

The precedence of lieutenants among each other shall be in order of merit, as determined by the combined results of the entrance examination and the examinations undergone while on probation.

Lieutenants, when appointed on probation, will receive instructions as to the provision of uniform.

EXAMINATIONS.

Subjects for the Entrance Examination.

Candidates will be examined by the Examining Board in medicine and surgery. The examination will be of a clinical and practical character, partly written and partly oral, marks being allotted under the following scheme:—

	Maximum Marks.
MEDICINE (WRITTEN).	
A. Examination and report upon a medical case in the wards of a hospital	125
B. Commentary upon a case in medicine	125
(Three hours allowed for A and B together.)	
MEDICINE (ORAL).	
A. Clinical cases; clinical pathology	75
B. Morbid anatomy and morbid histology	75
(One quarter of an hour allowed for each table.)	
SURGERY (WRITTEN).	
A. Examination and report upon a surgical case in the wards of a hospital	125
B. Commentary upon a case in surgery	125
(Three hours allowed for A and B together.)	
SURGERY (ORAL).	
A. Clinical cases, including diseases of the eye; surgical instruments and appliances	75
(One quarter of an hour allowed for this table.)	
B. Operative surgery and surgical anatomy	75
Total marks	800

The following headings are published as a guide to candidates in drawing up their reports on cases:—

(*a*) A brief history of the case as given by the patient, including such points only (if any) in the family or personal history as have a distinct bearing upon the present illness or incapacity. (*b*) A detailed account of the subjective symptoms and physical signs elicited by the candidate's personal examination of the patient, noting the absence of any which might be expected to be present in a similar case. (*c*) Where there is any reasonable doubt in the mind of the candidate as to an exact

diagnosis, he is to give the alternatives, with his reasons for making the selection. (*d*) A commentary upon the case as a whole, pointing out the symptoms which may be considered typical, and those which appear to be unusual or only accidental complications. (*e*) Suggestions as to treatment, both immediate and possibly necessary at a later date. (*f*) A forecast of the progress and probable termination of the case.

Similarly, the commentary on the report of a case submitted to the candidate should discuss:—

(*a*) The family and personal history and other conditions preceding the development of the condition described. (*b*) The relative significance of the physical signs, symptoms, other indications of disease noted, and the general clinical aspects of the case. (*c*) The diagnosis, with reasons for selection of the most probable, when a positive diagnosis cannot be attained. (*d*) The treatment, dietetic, medicinal, operative, etc., including a criticism of the plan adopted, and alternative schemes of treatment in case of disagreement. (*e*) The morbid appearances and an account of the post-mortem examination (if any).

The examination will be held in London, and will occupy about four days.

The appointments announced for the competition will be filled up from the list of qualified candidates, arranged in the order of merit, as determined by the total number of marks each has obtained. Having gained a place in this entrance examination, the successful candidates will undergo two months' instruction in hygiene and bacteriology, after which they will be examined in these subjects. The maximum number of marks obtainable at this examination will be 100. It has been determined that this course shall be delivered in London, and not as heretofore at Netley.

On completion of the above course, lieutenants on probation will be ordered to proceed to the depôt of the Royal Army Medical Corps at Aldershot for a three months' course of instruction in the technical duties of the corps, and at the end of the course will be examined in the subjects taught. The maximum number of marks obtainable at this examination will be 100. A lieutenant on probation who fails to qualify in either of these examinations will be allowed a second trial, and, should he qualify, will be placed at the bottom of the list. Should he again fail in either examination, his commission will not be confirmed.

Extracts from the Royal Warrant for Pay and Promotion, 1894, *as amended by Royal Warrant of* 18*th September* 1894, *and from the Regulations for Army Medical Services*, 1902.

PAY.

The pay of the officers of our Army Medical Staff shall be at the following rates:—

AT HEADQUARTERS.	Inclusive of all Allowances except Field and Travelling Allowances (Yearly).
Director-general	£2000 0 0
Deputy director-general	1500 0 0
Assistant director-general	850 0 0
Deputy assistant director-general	750 0 0

AT OTHER STATIONS.

	Excl. of Allowances (Daily).
Surgeon-general	£3 0 0
Colonel	2 0 0
Lieutenant-colonel	1 10 0
Lieutenant-colonel specially selected for increased pay after at least 8 years' service abroad	1 15 0
Major	1 3 6
After 3 years as such	1 6 0
Captain	0 15 6
After 7 years' total full-pay service	0 17 0
,, 10 years' total full-pay service	1 1 0
Lieutenant on probation and lieutenant	0 14 0
Adjutant of the Royal Army Medical Corps (Volunteers)	The Pay of his Rank.

RETIRED PAY.

An officer of our Medical Staff, after completing ten years' service on full pay, may be permitted to retire from our army with retired pay or gratuity, according to the scale laid down in Art. 1071, if such voluntary retirement be specially recommended by our Commander-in-Chief, and approved by our Secretary of State.

The appointment of Director-General of the Army Medical Department shall be for seven years, and the retirement of the other officers of our Army Medical Staff shall be compulsory at the following ages, except that, if it should in any particular case be considered desirable in the interests of the public service, the age for the retirement of a surgeon-general may be extended for a period not exceeding two years—surgeon-general, 60 years; surgeon-colonel, 57 years; and other officers, 55 years.

SCALE OF RETIRED PAY.

	Yearly.
Director-general after three years' service in the appointment (with 30 years' service)	£1125 0 0
Under 3 years' service as Director-general and after not less than 30 years' service	875 0 0
	Daily.
Surgeon-general	£2 0 0
Colonel, R.A.M.C., and Household Troops	1 15 0
Lieutenant-colonel, R.A.M.C., and surgeon-lieutenant-colonel, Household Troops:—	
After 20 years' service	1 0 0
,, 25 ,,	1 2 0
,, 30 ,,	1 5 0
Lieutenant-colonel, after having been in receipt of the increased pay (5s. a day additional) for 3 years, or a brigade surgeon-lieutenant-colonel of the Household Troops:—	
Under 30 years' service	1 7 6
After 30 ,,	1 10 0
Major, or surgeon-major of the Household Troops:—	
After 20 years' service	1 0 0
,, 25 years' service, if his service reckoning for promotion is insufficient to qualify him for promotion to the rank of lieutenant-colonel under Article 351	1 2 6

	Gratuity.
Major or captain :—	
After 5 years' service in the rank of captain	£1000 0 0
„ 3 „ „ major	1800 0 0
„ 6 „ „ „	2500 0 0
Surgeon-lieutenant-colonel or surgeon-major of the Household Troops :—	
After 15 years' service	1800 0 0
„ 18 „	2500 0 0

Except in the case of a lieutenant-colonel, an officer of the Army Medical Service, who, on voluntary retirement, has served for less than three years in the rank from which he retires, shall be entitled only to the gratuity or retired pay assigned to the next lower rank.

PROMOTION.

Every promotion of a medical or departmental officer shall be given upon the recommendation of the Commander-in-Chief, with the approval of the Secretary of State. Promotion by selection shall be given on the ground of ability and merit, due consideration being given, however, to length of efficient service.

An officer shall be eligible for promotion to the rank of captain on the completion of three and a half years' service, and to the rank of major on the completion of twelve years' service, provided that, in each case, he has previously qualified in such manner as may be prescribed by the Secretary of State.

Promotion to the rank of lieutenant-colonel shall be made by selection from officers who have completed at least twenty years' service, and have qualified in such manner as may be prescribed by the Secretary of State.

If an officer has passed with distinction the examination qualifying for promotion to the rank of major, the period of service required to render him eligible for the rank of major or lieutenant-colonel may be reduced as follows:—

	Months.
If he obtained a "special certificate"	18
„ passed in the 1st Class	12
„ „ „ 2nd „	6
„ „ „ 3rd „	3

Promotion to the rank of colonel shall be made by selection from lieutenant-colonels who have been specially selected for increased pay and from lieutenant-colonels or surgeon-lieutenant-colonels of the Household Troops specially recommended to the Secretary of State for distinguished service in the field. Promotion to the rank of surgeon-general shall be made by selection from colonels. A colonel may also be promoted to the rank of surgeon-general, for distinguished service in the field. In cases of distinguished service in the field a departmental officer may, with the concurrence of the Lords Commissioners of the Treasury, be promoted from any rank or class to the next above it, and shall, if promoted to a rank or class having a fixed establishment, remain supernumerary in such rank or class until the occurrence of the vacancy to which in the ordinary course he would have been promoted. An officer of the Royal Army Medical Corps is eligible for promotion to brevet rank. A captain after at least six years' service, a major or lieutenant-colonel, may be promoted to the next higher rank by brevet, for distinguished service in the field or for distinguished service of an exceptional nature other than in the field. If the officer dies before the date on which the notification of his promotion for distinguished service in the field appears in the *London Gazette*, the promotion shall bear the date which it would have borne had the officer not died. Distinction in original investigation or research may, in the case of officers of the Royal Army Medical Corps, be regarded as "distinguished service of an exceptional nature other than in the field." An officer who does not qualify for promotion to the rank of captain or major within the periods specified, shall be placed on the supernumerary list until he qualifies or is retired from the service. Service on the supernumerary list shall not reckon towards promotion, increase of pay, gratuity, or pension.

EXAMINATIONS FOR PROMOTION IN THE ROYAL ARMY MEDICAL CORPS.

Lieutenant before promotion to captain.—(For lieutenants appointed after March 31, 1901.) This examination may be taken at any time after completing 18 months' service, and will be held in the military district in which the officer is serving. The subjects of this examination, which are detailed in the King's Regulations, are as follows:—

(1) Regimental duties; (2) drill; (3) military law; (4) duties and accounts connected with military hospitals and their supplies; and (5) other duties of executive medical officers.

Captain before promotion to major.—(For captains promoted to that rank after July 27, 1895.) Captains will be examined under the rules laid down in Paragraph 24, and will be eligible for acceleration in their promotion to the rank of major, under Article 352 of the Royal Warrant.

This examination, which may be taken at any time after completing five years' service, will be held in London on the termination of a period of special study. The examination will consist of written papers, essays, oral and practical examinations in the following subjects, which are detailed in the King's Regulations:—

(1) Medicine; (2) surgery; (3) hygiene; (4) bacteriology and tropical disease; and (5) one special subject, from the subjoined list, to which additions may from time to time be made—(*a*) bacteriology, including the preparation of antitoxine; (*b*) dental surgery; (*c*) dermatology; (*d*) laryngology; (*e*) midwifery and gynæcology; (*f*) operative surgery, advanced; (*g*) ophthalmology; (*h*) otology; (*i*) pediatrics; (*k*) psychological medicine; (*l*) skiagraphy; and (*m*) specific fevers.

Captains serving in that rank before July 27, 1895, will be promoted under the old regulations contained in Appendix I., Regulations for Army Medical Services, and will not be eligible for acceleration.

Majors before promotion to lieutenant-colonel (for majors promoted to the rank after March 31, 1895).—This examination, which may be taken at any time after three years in the rank of major, will be held in the military district in which the officer is serving, at times which will be duly notified. The subjects of this examination, which are detailed in the King's Regulations, are as follows:—

(1) Military law; (2) army medical organisation; (3) sanitation of towns, camps, transports, etc.; (4) epidemiology and the management of epidemics; (5) one special subject from the subjoined list to which additions may from time to time be made—(*a*) medical history of important campaigns; (*b*) a general knowledge of the Army Medical Services of other Powers; and (*c*) the laws and customs of war in relation to the sick and wounded.

The questions and answers will be forwarded, under a sealed confidential cover, to the Director-General of the Army Medical Department, for transmission to the examiners, who will report to the Director-General as to the competence of the officer examined.

INDIAN MEDICAL SERVICE.

The regulations for the examination of candidates for admission to His Majesty's Indian Medical Service differ only slightly from those of the home service. The declarations are sent to the Military Secretary, India Office, Westminster.

The physical fitness of each candidate will be determined previous to examination by a board of medical officers, who are required to certify that his vision is sufficiently good to enable him to perform any surgical operation without the aid of glasses. Further particulars as to the standard of eyesight will be found in a pamphlet by Sir J. Fayrer, M.D., K.C.S.I., entitled "Regulations as to Defects of Vision," published by Messrs. J. & A. Churchill, 7 Great Marlborough Street, W. A moderate degree of myopia will not be considered a disqualification, provided it does not necessitate the use of glasses during the performance of operations, and that no organic disease of the eyes exists. Every candidate must also be free from all other organic disease, and from constitutional weakness, or other disability likely to unfit him for military service in India. Candidates who pass the Medical Board Examination will be required to pay a fee of £1 before being permitted to compete.

On producing the foregoing qualifications, the candidate will be examined by the Examining Board in the following subjects, and the highest number of marks attainable will be distributed as follows:—

	Marks.
1. Medicine, including therapeutics	1200
2. Surgery, including diseases of the eye	1200
3. Surgical anatomy and physiology	600
4. Pathology and bacteriology	600
5. Midwifery and diseases of women and children	600
6. Chemistry and pharmacy, with either botany or zoology	600

Course at Netley.—These courses will be of not less than four months' duration; but candidates who have already gone through a course at Netley, as candidates for the Army Medical Service, may, if thought desirable, be exempted from attending the School a second time.

At the conclusion of the course at Netley, and after the leaving examination, the position of the candidates on the list of surgeon-lieutenants will be determined by the combined results of the Preliminary and Final Examinations, and, so far as the requirements of the service will permit, they will have the choice of commands in India (*i.e.* Bengal, Punjab, Madras, or Bombay) according to their position in that list.

Officers appointed to the Indian Medical Service will be placed on one list. Though ordinarily employed within the limits of the command to which they may have been posted, they will be liable to employment in any part of India, according to the exigencies of the service.

No candidate will be permitted to compete more than three times.

Examinations for admission to the service usually take place twice in the year, *i.e.* in February and August.

The examiners in London will prepare a list in order of merit, with the marks affixed in the different subjects, to be transmitted to the Director-General and communicated to the professors of the Army Medical School. If any candidate is found to be deficient in any particular subject, this shall be stated, in order that he may receive special instruction on the point at Netley.

PAY AND ALLOWANCE.

The following are the rates of "Indian pay and allowances" which will be drawn by officers hereafter appointed to the Indian Medical Service:—

Rank.	Years' Service.	Indian Pay and Allowances per mensem. When not holding an appointment carrying higher pay. R.	A.	P.
Lieutenant-colonel (senior)	25 and over	900	0	0
Lieutenant-colonel	,,	888	12	0
,, ,,	20 ,,	852	3	7
Major	15 ,,	677	6	11
,,	12 ,,	640	14	6

Rank.	Years' Service.	*A.* When not receiving any Staff Allowance.			*B.* When receiving Staff Allowance in addition.		
		R.	A.	P.	R.	A.	P.
Captain	10 and over	500	0	0	450	0	0
,, ...	5 ,,	450	0	0	400	0	0
Captain and lieutenant .	under 5	350	0	0	300	0	0

On first appointment they will only come into receipt of "Indian pay and allowances" (Column *A*) from the date of their arrival in India.

Officers holding the principal administrative appointments and substantive military charges of the Indian Medical Service, receive at present the following consolidated salaries:—

	Rs. per mensem.
Surgeon-general, ...	2200 to 2700
Colonel { from	1800
Colonel { to	2250
Lieutenant-colonel of twenty years' service and upwards	1100 with Rs. 90 horse allowance in cavalry regiments.
Lieutenant-colonel, in substantive charge of a native regiment	1000 with Rs. 90 do.
Major, under twenty years' service, in substantive charge of a native regiment . .	800 with Rs. 90 do.
Captain, above five years' full pay service, in substantive charge of a native regiment .	600 with Rs. 60 do.
Captain, or lieutenant under five years' do., in substantive charge of a native regiment .	450 with Rs. 60 do.

The salaries of other substantive medical appointments in the civil and military departments are consolidated, and vary from Rs. 1800 to Rs. 400 per mensem.

Leave Rules.

Officers of the Indian Medical Service, below the rank of surgeon-colonel, may be granted—(1) Privilege leave, under such regulations as may from time to time be in force; (2) leave out of India, for no longer period than one year, capable of extension to two years' absence from duty, on the following pay:—

After arrival in India, on first appointment	£200 a year.
After the commencement of the 5th year's service for pension . .	250 ,,
Do. do. 10th do. . .	300 ,,
Do. do. 15th do. . .	400 ,,
Do. do. 20th do. . .	450 ,,
Do. do. 25th do. . .	500 ,,

(3) Leave in India, but for the period of one year only, on full military pay and half the staff salary of appointment.

Retiring Pensions and Half-Pay.

Officers of the Indian Medical Service will be allowed to retire on the following scale of pension, on completion of the required periods of service:—

After 30 years' service for pension	. . . . .	£700 per annum.
,, 25 ,, ,,	. . . . .	500 ,,
,, 20 ,, ,,	. . . . .	365 ,,
,, 17 ,, ,,	. . . . .	292 ,,

Officers not entitled to pension, when placed on temporary or permanent half-pay, will be granted the British rate of half-pay of their military rank as under:—

Rank.	Rates of Half-pay. Per diem.		Per annum.		
	s	d.	£	s.	d.
Lieutenant-colonel (senior) Lieutenant-colonel	11	0	200	15	0
Major	9	6	173	7	6
Captain	7	0	127	15	0
Lieutenant	3	0	54	15	0

Officers cannot retire *in India* on half-pay (No. 45, 28th February 1865).

NAVY MEDICAL DEPARTMENT.

The regulations for this service correspond very closely to those for the army, with the following exceptions:—

The candidate must also declare his readiness to engage for general service at home or abroad as required.

The official requirements in the natural sciences are as follows:—

Zoology.—The examination in zoology will include the general principles of biology and a comparison of animals with plants; the distinctive characters of the larger group of animals—the protozoa, cœlenterata, vermes, arthropoda, mollusca, echinodermata, and vertebrata—as illustrated by common types; the elements of embryology; animal parasites.

Botany.—The general principles of the morphology and physiology of low forms of life, for example, torula, bacteria, spirogyra, moss, fern; the general morphology of flowering plants; diagnosis of the important British natural orders; medicinal plants.

Physics.—The general principles of mathematics, acoustics, optics, heat, magnetism, and electricity, as: the properties of solids, liquids, and gases; conservation of energy, specific gravity, propagation and reflection of sound and light, temperature, specific and latent heat, thermometers, properties of mirrors and lenses, chromatic dispersion of light, forms of batteries, galvanic and frictional electricity, general properties of magnets.

Physical geography.—The relation of the earth to the rest of the solar system, nature of the earth's crust; the chief kinds of rocks; general configuration of land and water, mountains, plains, lakes, rivers, islands, glaciers and icebergs; the ocean currents, tides, the earth's atmosphere, winds and storms, dew, rain, climate, volcanoes, earthquakes; general distribution of animal and vegetable life.

Successful candidates, immediately after passing the examination, will receive commissions as surgeons in the Royal Navy, and will undergo a course of practical instruction in naval hygiene, etc., at Haslar Hospital.

PAY AND RANK.

Rank.	Daily.			Yearly.		
	£	s.	d.	£	s.	d.
Surgeon—on entry	0	14	0	255	10	0
,, after 4 years' full-pay service	0	17	0	310	5	0
,, ,, 8 ,, ,,	1	0	0	365	0	0
Staff-surgeon—on promotion	1	4	0	438	0	0
,, after 4 years' full-pay service in rank	1	7	0	492	15	0
Fleet-surgeon—on promotion	1	10	0	547	10	0
,, after 4 years' full-pay service in rank	1	13	0	602	5	0
,, ,, 8 ,, ,,	1	16	0	657	0	0
Deputy inspector-general	2	2	0	766	10	0
Inspector-general	...			1300	0	0

On first appointment to the service, medical officers will receive full pay from date of appointment, but subject to the provisions of Art. 1342, Clause 2, of the Queen's Regulations, 1893.

The allowance of 5s. a day, in addition to full pay, at present granted to the fleet-surgeon of a flag ship, bearing the flag of a commander-in-chief on a foreign station, will be given to the senior medical officer, being a fleet- or staff-surgeon, and an allowance of 2s. 6d. a day to the senior medical officer, being a fleet- or staff-surgeon, of the ship of a commodore, or of a senior officer commanding a foreign station.

Medical officers conducting the course of instruction at Haslar Hospital will receive the following allowances:—

The senior officer employed upon this duty	£150 a year.
The junior officers assisting	50 a year.

The hospital allowances for naval medical officers at home and abroad, in lieu of provisions for themselves and servants, and for fuel and light, are as follow:—

	At Home.	Abroad
Deputy inspectors-general	£67	£112
Fleet-surgeons and staff-surgeons	53	112
Surgeons	39	108

Medical officers serving afloat receive an allowance of 1s. 6d. a day in lieu of provisions, fuel and lights, as laid down in the King's Regulations. The travelling allowances, extra pay, lodging money, and compensation for losses, are fixed for naval medical officers according to their relative rank in the service.

HALF-PAY.

The undermentioned scale of half-pay is substituted for that hitherto in force:—

Rank.	Daily.			Yearly.		
	£	s.	d.	£	s.	d.
Surgeon—under 2 years' full-pay service	0	6	0	109	10	0
,, after 2 years' full-pay service	0	7	0	127	15	0
,, ,, 4 ,, ,,	0	8	0	146	0	0
,, ,, 6 ,, ,,	0	9	0	164	5	0
,, ,, 8 ,, ,,	0	10	0	182	10	0
,, ,, 10 ,, ,,	0	11	0	200	15	0
Staff-surgeon—on promotion	0	12	0	219	0	0
,, after 2 years' full-pay service in rank	0	13	0	237	5	0
,, ,, 4 ,, ,,	0	14	0	255	10	0
,, ,, 6 ,, ,,	0	15	0	273	15	0
Fleet-surgeon—on promotion	0	17	0	310	5	0
,, after 2 years' full-pay service in rank	0	18	0	328	10	0
,, ,, 4 ,, ,,	0	19	0	346	15	0
,, ,, 6 ,, ,,	1	0	0	365	0	0
Deputy inspector-general—on promotion	1	5	0	456	5	0
,, after 2 years' full-pay service in rank	1	7	0	492	15	0
,, ,, 4 ,, ,,	1	9	0	529	5	0
Inspector-general	1	18	0	693	10	0

PRISON MEDICAL SERVICE.

This branch presents limited opportunities, either for entrance, or for subsequent advancement. The smaller prisons are officered, as a rule, by local practitioners. The medical officers to the larger prisons are appointed by the Convict Prison Board, or the Prison Commission. Special forms may be obtained from the secretary of the latter at the Home Office, on which applications are to be made. In the Convict Service there are eight posts, with salaries ranging from £250 to £550; in the Local Prison Service twenty-eight officers, with salaries from £250 to £500.

COLONIAL SERVICES.

Applicants for posts under the Colonial Office must be between the ages of 23 and 30, be doubly qualified, and preferably have held hospital appointments. The usual certificates require to be shown, and an official medical examination undergone. Applications for posts or for information are to be sent to the assistant-secretary, Colonial Office. As a rule, about twelve to fifteen vacancies occur annually. In addition to these, a number of semi-official appointments are made yearly by this office, in connection with public works, etc., in the Colonies.

PRACTITIONERS ABROAD.

In the majority of the British Colonies local registration of legal British qualification suffices to allow a practitioner to pursue the duties of his profession. Only in two (cf. Table VII.)

is this unnecessary; while in one, Ontario, a local diploma must be gained after examination.

Few of the foreign nations allow British registered practitioners to practise, unless they first pass the State examinations. Table VII. gives a tabular view of the different regulations current:—

TABLE VII. COLONIES AND COUNTRIES IN WHICH DULY REGISTERED BRITISH GRADUATES AND DIPLOMATES CAN PRACTISE.

1. WITHOUT COMPULSORY LOCAL REGISTRATION.

New South Wales, South Australia, Italy (only among visitors and aliens).

2. (*a*) AFTER LOCAL REGISTRATION.

Victoria, Tasmania, Queensland, New Zealand (£1, 5s. fee); Western Australia, Natal[1] (£1, 1s. to £3, 3s.); Cape Colony (£5 fee); Prince Edward Island ($20); New Brunswick ($1 to $2 a year); Nova Scotia, Quebec, Manitoba, North-West Territories ($50, and $1 to $2 a year); British Columbia, Jamaica, Klondyke ($50 fee); British Guiana, Fiji, Gold Coast, Gibraltar, Leeward and Virgin Islands, Monaco.

(*b*) AFTER APPLICATION FOR PERMISSION.

Belgium, Greece (examination in French or English); Italy.

3. ONLY AFTER EXAMINATION.

State examination.—Austria, Denmark, Holland, Germany, Greece, Portugal, Roumania (*vivâ voce*), Russia, Norway, Spain, Sweden, Switzerland, Brazil (in French or Portuguese).

University or local examinations.—France, Turkey (£4, 10s. fee); Argentine (in Spanish); Chili (*vivâ voce*); Peru (*vivâ voce*); Uruguay (*vivâ voce*); Ontario.

4. AMERICA.

Twenty-four States require the passing of an examination; seventeen States require the same, or approval of the diploma presented by the applicant; and in nine, presentation of the diploma or degree is sufficient. The last nine are—

Alaska Territory, District of Columbia, Michigan, Arkansas, Kansas, Ohio, Arizona Territory, Nevada, Wyoming.

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[1] Annual licence also of £5.

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